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PAPERS

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VOL. IV.—NO. 3.

ANIMAL FIGURES IN THE MAYA CODICES

BY

ALFRED M. TOZZER PH.D.

AND

GLOVER M. ALLEN, PH.D.

CAMBRIDGE, MASS.
PUBLISHED BY THE MUSEUM
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NOTE

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While it is possible that some of the determinations given in this paper may require further confirmation, it is evident that the combined studies of Dr. Tozzer and Dr. Allen cannot fail to be useful to students of the Maya hieroglyphic writing.

F. W. Putnam.

Harvard University,
August, 1909.

KEY TO THE PRONUNCIATION OF MAYA WORDS

The vowels and consonants have their continental sounds with the following exceptions:—

ă like *u* in hut
ai like *i* in island
k (Beltran's *c*) ordinary palatal *k*
q (Beltran's *k*) velar *k*
ȩ (Beltran's ɔ) *ts* explosive or fortis
ɔ (Beltran's *tz*) *ts* non-explosive
š (Beltran's *x*) like *sh* in hush
tš (Beltran's *ch*) like *ch* in church
ts (Beltran's *cħ*) *ch* explosive
ṗ (Beltran's *pp*) *p* explosive
ṭ (Beltran's *tħ*) *t* explosive

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11. Reptilia: Serpents.
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NOTE

It has been thought desirable, for the advancement of the study of Maya hieroglyphs, that the interpretation of the conventionalized animal figures, which so frequently occur in the Maya codices, should be undertaken. The Peabody Museum Committee on Central American Research therefore requested Dr. A. M. Tozzer to prepare a paper on the subject, and to secure the valuable cooperation of Dr. Glover M. Allen, a zoologist familiar with the animals of Mexico and Central America, to aid in the identification of the various species of animals which under varying forms are used in connection with the glyphs.

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field practically untouched.* Förstemann in his various commentaries on the Maya codices (1902, 1903, 1906), Brinton (1895), and deRosny (1876) have only commented briefly upon this side of the study of the manuscripts. Seler (1904a) and some others have written short papers on special animals. During the preparation of this paper there has appeared a brief account by Stempell (1908) of the animals in the Maya codices. The author has, however, omitted a number of species and, as we believe, misidentified others. In making our identifications we have given the reasons for our determinations in some detail and have stated the characteristics employed to denote the several species.

We have not limited ourselves entirely to the Maya manuscripts as we have drawn upon the vast amount of material available in the stone carvings, the stucco figures, and the frescoes found throughout the Maya area. This material has by no means been exhausted in the present paper. In addition to the figures from the Maya codices and a comparatively few from other sources in the Maya region, we have introduced for comparison in a number of cases figures from a few of the ancient manuscripts of the Nahuas and the Zapotecs to the north. The calendar of these two peoples is fundamentally the same as that of the Mayas. The year is made up in the same way being composed of eighteen months of twenty days each with five days additional at the end of the year. There is therefore a more or less close connection as regards subject matter in all the pre-Columbian codices of Mexico and Central America but the manner of presentation differs among the different peoples of this region.

*The first two parts of Dr. Seler's Treatise, "Die Tierbilder der mexikanischen und der Maya-Handschriften" published in the *Zeitschrift für Ethnologie*, Vol. 41, have appeared during the time when this paper was passing through the press. The most excellent and exhaustive treatment by Dr. Seler would seem to render the present paper unnecessary. It has seemed best, however, to continue with its publication inasmuch as its field is narrower and more space is devoted to the Maya side of the question to the exclusion of the Mexican. Dr. Seler, on the other hand, while by no means neglecting the Maya, has spent more time in explaining the Mexican figures.

I

SYNOPTIC CONSIDERATION OF THE MEANING AND OCCURRENCE OF ANIMAL FORMS

Before taking up the different animals in the codices it may be well to consider some of the more common ways in which the figures occur and their connection with the surrounding figures.

MANNER OF REPRESENTATION. The entire body of the animal may be represented realistically or the head alone may be shown. The animal head is frequently attached to a human body. The animal may appear conventionalized to a greater or less extent and the head in turn may change in the same way until only a single characteristic of the animal remains by which to identify it as, for example, the spots of the jaguar or the feathering around the eye of the macaw. In the case of the glyphs, a term employed to designate the regular and usually square characters appearing in lines or columns throughout the codices and inscriptions, we find both the realistic drawing and that where conventionalism has come in.

THE TONALAMATL. The Maya codices are made up, for the most part, of the records of the sacred period of two hundred and sixty days, a period called in Nahuatl, *tonalamatl*, and other numerical calculations. The *tonalamatl* was used for purposes of divination in order to find out whether good or bad fortune was in store for an individual. It is not necessary at this place to go into the different means taken to record this period of time or its methods of use. It may be well, however, to explain the usual distribution of the pictures in the codices, including those of animals, in connection with the representation of the *tonalamatl*. A normal period is shown in

Dresden 6c–7c. A column of five day signs occurs in the middle of 6c with a single red dot over it. To the right of this column stretches a horizontal line of numbers consisting of alternate groups of black and red lines and dots. Under each pair of red and black numbers there is usually a human form and over each pair a group of four glyphs belonging to the figure below. Schellhas (1904) has classified the various figures of gods appearing in these vignettes of the *tonalamatl* and lettered them. References throughout the paper will be made to the gods by letters and the reader is referred to Schellhas' paper. Animal figures often take the place of these gods as in the second picture in Dresden 7c where the screech owl is shown with human body. The greater number of animal figures in the codices occur in some connection with these *tonalamatls*.

MYTHOLOGICAL ANIMALS. Where figures are shown with human body and animal head standing alone in the place usually occupied by one of the various deities in the *tonalamatl*, there can be little doubt that they have a mythological meaning and are to be taken, either as gods themselves, or as representing certain of the gods. All of the animals are by no means shown in this position. The screech owl, or Moan bird (as in Dresden 10a) appears most frequently in this way. The king vulture (Dresden 8a), the dog (Dresden 7a), and the parrot (Dresden 40b) come next in descending importance. The animals represented as copulating (as in Dresden 13c) might also be considered as mythological animals as well as the full drawings of the jaguar (Dresden 8a) and the other animals when they occur alone in the regular vignette of the *tonalamatl*. The four priests in Dresden 25a–28a should also be regarded as representing, in all probability, the dog as a mythological animal. The idea of worshipping animals as gods in themselves is strengthened by noting the ease with which the Maya people worshipped the horse which was left behind by Cortes in his march from Mexico across to Honduras (Villagutierre, 1701, pp. 100–101).

ASTRONOMICAL IDEAS. Animals frequently have a part to play in relation to the constellations. Throughout the codices and, to a less degree, in the stone carvings, we find what have

usually been considered to be glyphs for several of the constellations. Numerous calculations in the codices make it clear that the Mayas had a good knowledge of astronomy. These glyphs are usually oblong in shape and three or more are arranged together end to end. We have called these the constellation bands. Various attempts have been made to identify these signs of the various constellations. Animals frequently are pictured below these bands. The dog with fire brands in his paws and often attached to his tail is shown in several places coming head downward from one of these bands (as in Dresden 36a). The peccary is also shown in the same position although the fire brands do not appear (Dresden 68a). A figure with macaw head occurs once standing beneath one of these bands with fire brands in his hands (Dresden 40b). The serpent (as in Dresden 36a), the lizard-crocodile-like animal in Dresden 74, the turtle (Tro-Cortesianus 71a), the vulture (Dresden 38b), the turkey (Tro-Cortesianus 10b), and the deer (Tro-Cortesianus 47a) all appear in connection with these constellation bands. It is impossible at this time to decide upon the part these various animals play in relation to distinct constellations. In addition to the animals named, several of the gods, especially god B, are found below these bands. One of these signs, the one identified by Förstemann as standing for Saturn, is composed of the head of the crocodile more or less conventionalized.

Förstemann (1902, p. 27) identifies the turtle with the summer solstice and the snail as the animal associated with the winter solstice. There does not seem to be any one animal used in connection with any one of the cardinal points. In Tro-Cortesianus 88c the dog seems to be associated with the north as shown by the glyph which is ordinarily regarded as connected with that direction, the ape with the west, and an unidentifiable bird sitting on a *Cimi* (death) sign with the south. The east is connected in this place with a human figure. It should be stated, however, that it is not absolutely certain that the usual assignment of the cardinal points, each to its special direction, is correct. The signs for the east and west as well as those for the north and south may be reversed. With the ex-

ception of the assignment of the offering-glyphs to the various cardinal points which will be discussed later (p. 290) this is almost the only case where a clear relation can be made out between the various animals and the signs for the four directions. There is no definite relation as is seen, for example, in the Vaticanus 3773, 17, 18 where the quetzal is noted perched on the tree of the east, the eagle on that of the north, the humming bird on that of the west, and the jaguar on the tree of the south.

COPULATION. The conception, the period of pregnancy, the infant baptism, and possibly, the naming of children are shown in both the Tro-Cortesianus (91–95) and the Dresden (13–23). Animals are frequently shown copulating with various gods or with one another. In Dresden 13c, the deer and god M and the vulture and the dog; in 19c, the vulture and a woman; in Tro-Cortesianus 91d, a god and a woman; and in 92d, an armadillo and a deer both with female figures. These animals probably represent in some way the totems of the man or woman in question and are shown in place of the human figure. The Lacandones, a Maya people, show at the present time the remains of a totemic system (Tozzer, 1907, pp. 40–42). The deer (*Ke*) gens is found at the present time. In the greater number of cases where copulation is shown a god and a female figure are pictured. The presentation of the new-born children by women with bird head-dresses, also occurring in this same section of both manuscripts, is discussed later (p. 291).

ANIMAL SACRIFICES. Various ceremonials occurring at intervals throughout the Maya year which included sacrifices to the gods, evidently took up a large part of the time of the people. Animals composed by far the major part of the gifts made to the gods. This was especially true in regard to the ceremonies occurring at the beginning of each year. According to the Maya calendar there were four days only which could come at the beginning of the year and these came in succession. Landa (1864, pp. 210–233), the first Bishop of Yucatan, gives a minute description of the rites of the four years which were named according to the initial day. He also relates the manner in which the various animals are employed as offer-

ings in these rites and also in others taking place at the beginning of the various months.*

The rites which took place at the beginning and the end of the year are shown in Dresden 25–28 and in Tro-Cortesianus 34–37. The dog, the deer, and the turkey are the most important of the animals shown as being offered to the gods in this connection. It will not be necessary to consider these animals in detail at this place as they are each taken up later.

OFFERINGS SHOWN BY GLYPHS. It is, however, in another connection than that just considered that the animals are shown as offerings far more frequently throughout the Maya manuscripts. In the ceremonies of the four years, the animals and birds are, for the most part, represented entire and purely as pictures. Offerings are also shown in the form of glyphs. These may occur in connection with the figures of the gods or in the lines of hieroglyphs above the pictures. When they are used in the former relation they are usually shown as resting in a bowl or dish (Dresden 35a). It frequently happens that when a god is making an offering represented by the entire animal or a glyph of the animal in the main picture, there is a corresponding glyph of the offering above in the line of hieroglyphics (Dresden 23b).

The fish, iguana, turkey, deer and possibly the lizard

* p. 162. "Las mugeres no usavan destos derrammamientos, aunque eran harto santeras; mas de todas las cosas que aver podian que son aves del cielo, animales de la tierra, o pescados de la agua, siempre les embadurnavan los rostros al demonio con la sangre dellos."

p. 164. "Y otras cosas que tenian ofrecian; a algunos animales les sacavan el corazon y lo ofrecian, a otros enteros, unos vivos, otros muertos, unos crudos, otros guisados . . . . . Que sin las fiestas en las quales, para la solemnidad de ellas, se secrificavan animales, tambien por alguna tribulacion o necessidad."

p. 254. "Tenian buscados todos animales y savandijas del campo que podian aver y en la tierra avia, y con ellos se juntavan en el patio del templo en el qual se ponian los *Chaques* . . . . Sacavan con liberalidad los coraçones a las aves y animales, y echavanlos a quemar en el fuego; y sino podian aver los animales grandes como tigres, leones o largartos, hazian los coraçones de su encienso, y si los matavan trayanles los coraçones para aquel fuego."

are the usual animals shown as glyphs in this connection. The frigate bird occurs once in the Dresden (35a) and once in the Tro-Cortesianus (34a) as an offering. The dog, curiously enough, does not seem to be represented by an offering-glyph although he has a glyph of his own when appearing in other connections. The iguana and fish are shown entire although drawn very small; the head is the only part usually shown of the turkey and the haunch of venison of the deer. The head and feet of the lizard, as has been noted, may also be shown by a glyph. The turkey and iguana glyphs are very often found with a *Kan* sign indicating an offering of maize and bread as well as that of the animal. In connection with glyphs showing various offerings of food, there is one which occurs especially in the Tro-Cortesianus (as in 106a). This shows a row of points themselves running to a point over a *Kan* sign. This, as will be pointed out later (p. 318) may also represent an iguana. The jar containing a representation of the honey comb (as in Tro-Cortesianus 107b) might come in here in the consideration of the offering-glyphs.

In many instances the common offerings shown by glyphs are found associated with the signs for the four cardinal points but there does not seem to be any strict uniformity as to the special offering associated with each direction. In Dresden 29b, the lizard glyph is found in the same group with the sign commonly assigned to the east, the turkey with the south, the iguana with the west, and the fish with the north while in Dresden 29c, the deer is associated with the east, the fish with the south, the iguana with the west, and the turkey with the north. The iguana is usually found with the sign for the west and the fish with that of the south. The others vary greatly in the assignment of the various directions.

Schellhas (1904, p. 17) considers that the fish, the lizard, "the sprouting kernel of maize or (according to Förstemann, parts of a mammal, game)" and a vulture's head are symbols of the four elements. The head which Schellhas interprets as that of the vulture is certainly the head of a turkey. He remarks that these signs of the four elements appear with god B in the

Dresden manuscript. Other gods, as he also notes, are found with these four offering-glyphs. There seems to be a fifth glyph, however, (as in Dresden 29b) which we have interpreted as that of a lizard.

ANIMALS AS RAIN BEARERS. Various animals are associated with the rain and water. The serpent is most frequently represented in this connection. Snails, fish, the turtle, and the frog, as well as the lizard-crocodile figure in Dresden 74 are naturally found associated with water. The vulture-headed figure in Dresden 38b and the vulture as a bird in Tro-Cortesianus 10a both appear in the rain. The peccary (Dresden 68a), and the turkey (Tro-Cortesianus 10b) appear associated with the rain as well as with the constellation bands. The scorpion (Tro-Cortesianus 7a) encloses the rain within its legs.

The connection of an old female figure occurring in many places in the codices with the rain will be discussed later (p. 316) when considering the serpent. It remains at this place to comment upon the woman in Tro-Cortesianus 30b from whose breasts water is flowing. She is represented as having animal figures seated on her two outstretched hands and on her right foot together with another animal at her side. God B sits on her left foot. This picture immediately recalls representations in the Mexican codices where the various parts of the body of a god are associated with various day signs, ten of which have animal names. In the Maya picture, a jaguar is shown on the right hand, a peccary on the left, a dog on the right foot, and a rabbit beside the body at her right. The peccary is not represented among the Nahua day signs but the other three are found, namely the *oceolotl* (jaguar), *itzcuintli* (dog), and *tochtli* (rabbit).

ANIMAL HEAD-DRESSES. Animal figures appear perhaps most frequently as head-dresses of the various gods in the codices. Here, as elsewhere, from all that can be made out, the religious character is uppermost as in addition to being a decoration, they undoubtedly have some religious signification. Birds occur by far most commonly in this connection. Both male and female figures seems to have these head-dresses. The

same bird is often found as the head-dress of several different gods as, for example, the turkey which appears with gods A, B, C, E, and N. The vulture, on the other hand, when used as a head-dress for male figures, appears exclusively with god F. The whole bird is seldom represented on the head-dress of the male figures. It is usually only the head and a part of the body of the bird which forms but a portion of the whole head-covering. Landa (1864, p. 148)* notes the dress of the leader in the rites. He wears a jacket of red feathers worked with other feathers and from it hang long plumes. He also wears a feather head-dress.

Entire birds appear as the sole head-covering only in connection with female figures and then only in one section of the Dresden (16–18) and a parallel passage in the Tro-Cortesianus (94–95). In both these places the conception and the bearing of children are shown together with their baptism. The bird above the head of each female figure seems to be a badge of office, possibly the totems which are held by the women and given to the children. The parrot, quetzal, vulture, screech owl and the horned owl appear in this connection. It is to be noted that the birds associated with these women are not really represented as head-dresses at all. They are quite different from the head decoration composed of a bird's head and feathers seen in other parts of the manuscripts. In the Dresden especially, these birds above the women's heads are shown in almost every case standing with the claws clasping the necklace at the back of the neck. Landa (1864, pp. 144–154) gives an interesting account of the method of baptising children. He also states (p. 304)† that in the month *Yaxkin* an old woman brought the little girls to the general feast. This old woman

* "Vestido salia con un jaco de pluma colorado y labrado de otras plumas de colores, y que le cuelgan de los estremos otras plumas largas y una como coroza en la cabeça de las mesmas plumas."

† "Y a las niñas se les dava una vieja, vestida de un habito de plumas, que las traia alli y por esto la llamavan *Ixmol*, la allegadera. . . . . Aquella devota vieja allegaria con que se emborachava en casa por no perder la pluma del officio en el camino."

was dressed in a garment of feathers. It was understood that this devoted old woman was not permitted to become intoxicated* lest she should lose in the road the plume of her office.

The serpent appears as a head-dress exclusively with female figures and then usually when the woman is in the act of offering something or is associated with water or rain. The centipede occurs only with god D. Quadrupeds are employed as head-dresses only very seldom. The head of a deer is, in three places, used as a part of the head decoration of god M and the head of a jaguar appears in two places only.

SECULAR OCCUPATIONS. Animals appear frequently in scenes showing various occupations. These, although appearing at first sight as secular, have to do with the religion of the people and they show in every case acts undertaken in behalf of the deities. It is almost exclusively in the Tro-Cortesianus that these religious-secular occupations are shown.

Hunting scenes occur in one section of this codex (38–49). The whole aim of the hunt in these pages is to obtain animals for sacrifice. In almost every case the various animals are shown as being captured alive, either in a pitfall or a trap of the "jerk-up" type. This was undoubtedly in order that the animal might be killed the moment it was offered to the gods by having its heart cut out. Deer are most commonly represented in this hunting section although peccaries and armadillos also appear. Fishing is shown in one place at least (Dresden 33a).

The practice of agriculture is shown in Tro-Cortesianus 24–28. The sprouting grain is represented as being eaten by a vulture and a jaguar. Certain gods in this section which relates to the planting of maize are shown as being attacked by vultures and blow-flies. Another occupation of the natives depicted in the Tro-Cortesianus (103–112) is apiculture. This, again, has clearly some religious significance. Pottery-making is shown in the same manuscript (95–101). It is, however, a purely religious ceremony. The renewal of the incense-burners is shown.

* "Intoxication was obligatory with the men in many of the religious rites. This is reported by the early Spanish historians and is the case at the present time among the Lacandones." (See Tozzer, 1907, p. 136.)

Animals occur very infrequently in this section. The quetzal and two vultures are noted seated on top of an oven-like covering under which is the head of god C, probably representing the idol. There are several other occupations shown in this codex such as weaving (79c) and the gathering of the sap of the rubber tree (102b), but as animals do not occur in any connection with these operations, it is not necessary to dwell upon them.

ANIMAL GLYPHS. It remains finally to speak of the various animals which are represented in glyph form as well as drawn in full in the pictures proper. The creatures pictured in the codices are often accompanied by their glyphs which appear in the lines of signs directly above. In many cases, the animal pictured below is not represented by its glyph above and, vice versa, the animal glyph may appear without its picture below. The same is seen also in connection with the representation of the gods and their glyphs. Both the picture and the glyph usually appear but either may appear alone. Many times when the glyph, either of a god or an animal, is shown with no accompanying picture, the reason seems to be that there is no room for the latter on account of the numerical calculations which take up all the space.

There are some animals in the codices which are represented by glyphs very frequently. Among these are the screech owl (the Moan, the bird of death), which has several different glyphs by which it is recognized, the dog which, in addition to its own glyph, may be represented by the day sign *Oc*, the king vulture, the turtle, the bee (if we consider the day sign *Cauac* stands for this insect), and the centipede. Among the animals whose glyphs only seldom appear may be mentioned the macaw, the peccary, the tree-toad (god P), the quetzal, and the jaguar. The glyph for the black vulture (Tro-Cortesianus 26c), the ape (Tro-Cortesianus 88c), the deer (Peresianus 10), the eagle (Tro-Cortesianus 107c), and the serpent (Tro-Cortesianus 106c) seem to appear but once. It might also be well to mention in this place the glyphs for various molluscs which are used not to represent the shell but to give the value of zero to the numerical calculations.

In the inscriptions glyphs frequently occur which represent animals either showing the whole body or simply the head. In the eastern façade of the Monjas at Chichen Itza there are glyphs for both the king and the black vulture and the peccary. The macaw and the turtle seem also to be represented by glyphs in the inscriptions. The *Tun* period glyph shows vulture-like characteristics and the *Uinal* period glyph certainly resembles the lizard. The glyphs representing the various animal offerings have already been discussed under a special heading (p. 289).

II

ZOOLOGICAL IDENTIFICATION AND ETHNOLOGICAL EXPLANATION OF ANIMAL FORMS.

In the descriptions of the animals which follow the general plan will be to consider first the identification purely from a zoological point of view, and, secondly, the connection and, wherever possible, the meaning of the use of the various animal figures wherever they occur.

MOLLUSCA

FASCIOLARIA GIGANTEA. Representations of this marine shell are found in several places in the codices. It is the only large *Fusus*-like species on the western coast of the Gulf of Mexico, and, indeed, is the largest known American shell. It is therefore not strange that it should have attracted the attention of the Mayas and found a place in their writings. Several figures are shown that represent *Fasciolaria* (Pl. 1, figs. 1–9). One in the Codex Vaticanus 3773 (Pl. 1, fig. 3) in common with those shown in Pl. 1, figs. 2, 6, 9, has the spire represented by segments of successively smaller size. The species of *Fasciolaria* occurring on the Yucatan and adjacent coasts is characterized by numerous prominent bosses or projections on its later whorls, and these, too, appear in conventionalized form in most of the representations. In Pl. 1, fig. 2, the second whorl, and in figs. 6, 9, the third whorl is shown with three stout tubercles in side view, corresponding to those found in this region of the shell. Figs. 7, 8 (Pl. 1) are glyphs representing the same species, but as in fig. 4, the spire is omitted, though the knobs are present. Round spots of color are evidently intended by the markings on the shells shown in figs. 3, 5, 6 (Pl.1).

Fig. 5, shows a further modification of the spire, which here is made like the head of a serpent.

The *Mollusca* in the codices are not always associated with the water although this is usually the case. God N (Pl. 1, fig. 1) sitting with the shell around his body is represented as in the rain and the shells in Pl. 1, figs. 4, 6, appear under water. The snail (Maya, *šot*) is considered by the Nahuas as the symbol of birth and death. The first idea is well brought out in Pl. 1, fig. 2, where the human figure is emerging from a shell. The same idea among the Mayas is seen in Pl. 1, fig. 1, where god N is coming from a shell. As god N is usually associated with the end of the year, we may have here the complementary idea of death associated with the shell. The same meaning is brought out in the Bologna Codex (Pl. 1, fig. 3) where the shell is decorated with flint points, the symbol of death. As the tortoise is often identified with the summer solstice, as previously pointed out, so the snail is associated with the winter solstice.

Förstemann's identification of the head-dress of god D (Dresden 5c), god A (Dresden 9c, 13a), and god E (Dresden 11c) as representing snails is not clear. Stempell (1908, p. 739) also follows the same course thinking that the knob-like prominences represent the stalked eyes of snails. This seems quite unlikely as such representations are usually short and occur in too widely dissimilar connections. Moreover, there are sometimes three of these instead of but a single pair (Dresden 14a). A similar attempt has been made by Brinton to identify the head-dress of the death god (god A) as the snail. The head-dress in Dresden 13a and 13b associated with god A looks far more like the head and upper jaw of some mammal.

Oliva. A univalve shell frequently represented is of an oval shape, pointed at each end, with a longitudinal lip and a short spire at one extremity. This is doubtless a species of *Oliva*, a marine shell. Mr. Charles W. Johnson informs us that *O. reticulata* is the species occurring on the Yucatan shores, while *O. splendidula* is found in other parts of the Gulf of Mexico. Representations of this shell are shown in Pl. 1, figs. 10–12. In figs. 10, 11, the lip and spire are apparent but in fig. 12 the lip

only is seen as a white fissure against the general dark background. An earthenware vessel representing a tapir (Pl. 28, fig. 1) shows a string of *Oliva* shells about the animal's neck and similar strings very often decorate the belts worn by the personages represented on the stelae of Copan.

The shell in the codices is found in most cases to represent zero in the Maya numerical calculations. Just as a bar has the meaning five, and a dot one, so the shell often has the signification of zero. This is seen especially in the numeration by position in the codices (Pl. 1, figs. 7, 8, 10–14).

OTHER MOLLUSCA. In addition to the species just described at least two or three others occur in the Nuttall Codex, but so conventionalized that it is out of the question to hazard a guess at their identity. One (Pl. 1, figs. 16, 17) is a bivalve with long pointed shell, another (Pl. 1, figs. 18–20) is rounder with conventionalized scroll-like markings. Figs. 21, 22 (Pl. 1) may be a side view of the closed bivalve shown in figs. 16, 17, or possibly a species of cowry. In like manner, fig. 13 is probably a side view of the mollusc shown in fig. 14, for it is seen that in each case the figure showing the two opened valves has a bipartite extended foot, whereas that of the single valve is simple. This doubling of the single median foot of the bivalve may be an artistic necessity for the sake of balance, or perhaps represents both foot and siphon at the same end. Figs. 23, 24 (Pl. 1) seem to represent molluscs still further reduced and conventionalized. These molluscs from the Nuttall Codex (Pl. 1, figs. 15–24) are almost all found represented in the blue water, whereas those which stand for zero in the Maya codices have no immediate association with either water or rain.

INSECTA

THE HONEY BEE (*Melipona*). A portion of the Tro-Cortesianus appears to treat of apiculture, as previously noted, or, at all events, contains numerous figures of bees, some of which are shown in Pl. 2. As stated by Stempell (1908, p. 735) this is doubtless a species of *Melipona*, probably *M. fulvipes* or *do-*

mestica. It is well known that this bee was kept by the ancient Mexicans, and what appear to be improvised hives are shown in Pl. 2, figs. 7, 10, where the combs are noted depending from the ceiling or walls. These combs are seen to be composed of cells roughly four-sided for the most part, though in fig. 11 several hexagonal cells are present in the mass of comb held by the black god, M. Darwin, in his *Origin of Species,* has called attention to the form of the comb built by this bee, and considers its irregular cells of from three to six sides intermediate in their degree of perfection between those of the bumble bee (*Bombus*) and the honey bee of Europe (*Apis mellifica*). The *Caban* form in connnection with the hive in fig. 10 may have some phonetic signifiance as *kab* is honey in Maya. This sign occurs very frequently in the pages devoted to apiculture.

The figures of the bees in the codex show a number of interesting variations. In figs. 1–3, 5, 11, the insect is less conventionalized than in figs. 4, 6 (Pl. 2). The hairy feet are well indicated as well as the segmented body and a single pair of wings. All the figures show an anterodorsal view so that, on account of the size of the first pair of legs, only the tops of the second pair appear in Pl. 2, figs. 1, 3, 5. In fig. 2, however, two pairs are seen, and in figs. 4, 6, the anthropomorphic tendency is further shown by providing the insect with two pairs of limbs each with four or five digits, and a conventionalized face, eyes and mouth. In Pl. 2, fig. 1, the bee is represented without mouthparts but antennae only. This may indicate a drone or a queen bee that takes no active part in the work of gathering honey or making comb. Fig. 2 is perhaps the least reduced of any of the figures and shows the worker bee with antennae and mouthparts.

The so-called "cloud balls" of the day sign *Cauac* (Pl. 2, fig. 8) may represent the honey comb. *Cauac* is usually supposed to have some connection with lightening and thunder although Valentini agrees with the authors in associating *Cauac* with the bees and honey. The *Cauac*-like forms in Pl. 2, figs. 7, 10, have been described above as hives. The representation of legs in the full drawing of a bee as four large limbs, an anterior and a

posterior pair, coupled with the method of drawing the insect as seen from above and in front, may have led to its final expression by an X-shaped mark shown in connection with the hives (Pl. 2, figs. 7, 10). The X is also seen in the day sign *Cauac*.

Apiculture was common among the various peoples of Central America and Mexico. Las Casas speaks of hives of bees and Gomara states that the bees were small and the honey rather bitter. Clavigero (Vol. I, p. 68)* mentions six varieties of bees which were found in Mexico;—the first is the same as the common bee of Europe, the second differs from the first only in having no sting and is the bee of Yucatan and Chiapas which makes the fine clear honey of aromatic flavor. The third species resembles in its form the winged ants but is smaller than the common bee and without a sting. The fourth is a yellow bee, smaller than the common one but, like it, furnished with a sting. The fifth is a small bee without a sting which constructs hives of an orbicular form in subterranean cavities and the honey is sour and somewhat bitter. The *Tlalpipiolli*, which is the sixth species, is black and yellow, of the size of the common bee, but has no sting.

The natives of the country at the present time often cultivate hives of bees in logs which they hollow out for this purpose and keep in a specially constructed shelter. It is, however, rather the ceremonial side of apiculture that is the interesting feature and this is clearly emphasized in the Tro-Cortesianus. The section in this manuscript (80b, 103–112), as has been noted, is taken up almost exclusively with the culture of the bee and in all probability represents a definite religious ceremony or series of rites which are connected intimately with bees and honey. Landa (1864, p. 292)† states that in the month *Tzoz* the natives prepare for a ceremony in behalf of the bees which takes place in the following month, *Tzec*. In the month *Mol* another fiesta is undertaken in behalf of these insects so that

* Quoted in Thomas, 1882, pp. 115, 116.

† "En el mes de *Tzoz* se aparejavan los señores de las colmenares para celebrar su fiesta en *Tzec*."

the gods may provide an abundance of flowers for the bees (Landa, 1864, p. 306).*

It seems clear therefore that we have represented in the pages of the Tro-Cortesianus referred to, the rites carried out in this connection. The more or less realistic drawings of the bees (Pl. 2, figs. 1–6,9) represent the god of the bees and to him offerings of food and incense are being made. Pl. 2, fig. 11, shows the war god (M) with his eagle head-dress offering a mass of honey in the comb to the god of the bees.

Curiously enough the bee does not seem to be represented in the Dresden Codex. Förstemann's identification of the head-dress of the goddess in Dresden 9a as a bee does not seem to us to be correct.

In addition to the bees, there occurs in the Nuttall Codex 4 (Pl. 3, fig. 4) a curious representation of an insect with a pointed beak-like structure and a spine at the posterior extremity of its human-like body. It is engaged in apparent conflict with a man and may represent a hornet.

BLOW-FLY (*Sarcophaga*). Two figures in the Tro-Cortesianus (Pl. 3, figs. 1, 2) are of special interest since they appear to have been frequently regarded as picturing snakes attacking men. These are thick-bodied sinuous creatures distinguished by the curious conformation of the mouth and by a lateral row of dots that may represent the metameric spiracles or, as commonly, a demarcation between dorsal and ventral surfaces. That these are maggots of a blow-fly (*Sarcophaga*) there can be little doubt, not only on account of their mouthparts which are similar to those of the agave maggot (see later) but also because of their relation to God F whom they are devouring. The latter in fig. 1 is doubtless dead as shown by the closed eye and it is the habit of the blow-fly to deposit its eggs in the nasal cavity of dead animals as well as elsewhere on the body. The fact that in each case a maggot is attacking the god's nose may indicate that this habit was known to the artist who, consequently,

* " En este mes (*Mol*) tornavan los colmenares a hazer otra fiesta como la que hizieron en *Tzec*, para que los dioses proveessen de flores a las avejas."

shows the larvae in this position. In Pl. 3, fig. 2, the god's eye is not closed but his passive attitude while the maggot devours his hand and nose does not indicate that he is in full possession of his strength. In addition to the blow-fly, a screw-fly (*Chrysomyia*) lays its eggs on the bodies of animals, often on persons sleeping, and these may hatch almost at once into small maggots that penetrate the skin. It may be, therefore, that the larvae here considered belong to this genus.

In addition to god F, in Tro-Cortesianus 24d, there is another representation of the same god being attacked by a vulture. This bird is evidently eating his nose. In this case the god is shown with the closed eye as in 27d. In Tro-Cortesianus 25d the fly seems to be attacking the mouth of god F. From the fact that no other god is ever found in this connection it may be suggested that there may be some relation between god F as a god of human sacrifice and the fact that his dead body is being eaten by blow-flies and vultures. A portion of the body of the person sacrificed was usually eaten by those taking part in the ceremony.

LEPIDOPTEROUS INSECTS. In Tro-Cortesianus 28c (Pl. 3, fig. 3) is shown a second insect larva with curiously formed mouth parts. It is represented as attacking agave which is springing from the ground as shown by the *Caban* signs in the codex. Hough (1908, p. 591) has shown this to be the larva of *Acentrocneme kollari* Felder, "called by the Mexicans *guson*, and in Nahuatl *mescuillin*." This grub, he says, is white, about an inch long, and tunnels the fleshy leaves of the agave. It is greatly prized as an article of food for "*gusones* to this day are collected in April, boiled, wrapped in the epidermis of the agave, sold on the streets of Mexico, and are eaten with avidity. To all appearances they are nourishing and palatable, and it is said that connoisseurs prefer them to oysters or swallows' nests." Hough believes "that the discovery of the sap-yielding quality of the agave was through search for these larvae."

In the Nuttall Codex occur numerous representations of insects, some of which appear to represent butterflies or moths (Pl. 3, figs. 5–8) but these are quite unidentifiable. That shown

in fig. 6 is colored blue in the original, while the others are of various colors. Possibly the round markings on the wings in figs. 5, 8, represent the ocelli on the wings of certain species of moths. In this connection, too, it is interesting to compare the conventionalized butterfly with its single eye and pointed antennae from the Aubin manuscript (Pl. 3, fig. 9) with one drawn on the same plan from the Nuttall Codex (Pl. 3, fig. 8).

MYRIAPODA

Representations of a centipede (probably a species of *Scolopendra*) occur in the Dresden Codex and in several others examined. That shown in Pl. 5, fig. 1, from the Vaticanus 3773, is perhaps the least conventionalized.* This figure appears partly to encircle a temple, behind which the major portion of its length is hidden and hence is not here shown. The bipartite structure coming from the animal's head doubtless represents the mouthparts, and at its base on either side arise antennae. The first pair only of legs is shown with a pinching claw, possibly intended as a conventionalized hand, while the rest are simple. The plumes decorating the posterior extremity are of course extraneous and represent the tail of the quetzal or trogon.

In the Dresden Codex, god D constantly appears in connection with a head-dress from which depends a centipede, greatly reduced and conventionalized. Two forms of this centipede are shown in Pl. 3, figs. 15, 18. The body appears to consist of four or five segments each with its pair of ambulatory appendages (though there may not always be the same number of each) terminated by a circular segment with a conventionalized three-knobbed structure, apparently corresponding to the portion that bears the quetzal plume in Pl. 5, fig. 1. The outline of the head in Pl. 3, fig. 15, is shown in dotted line but by solid line in fig. 18. One of the antennae appears to be omitted from the former figure, also, but both are present in the latter. The

* Strebel (1899, Pl. 11) gives several realistic reproductions of the centipede from pottery fragments.

insect-like head is made on much the same plan as that of the bee (Pl. 2, fig. 11), the facial portion divided by a median line into a right and a left half with a small triangle below for a mouth. The eyes, however, instead of being circular like those of the bee are made as narrow elongated projections extending inward from the dorsal margin of the facial disc.

The glyphs for god D in Dresden 7b (Pl. 3, fig. 11), Dresden 7c, and Dresden 14b (Pl. 3, fig. 12) undoubtedly show three forms of the sign for god D, only one of which (fig. 12) is given by Schellhas (1904, p. 22) among the signs of this god. In each of these cases the centipede head surrounded by dots is shown in connection with the main part of the glyph. In Dresden 44b (Pl. 3, fig. 13) there is a glyph which seems to show the same centipede head although it has no connection with god D in the place where it is found. In Dresden 27 (Pl. 3, fig. 14), moreover, still another variant of the glyph for god D seems to occur. This shows a prefix clearly representing the centipede and the "moon sign" is the main part of the glyph. Directly beside this in the codex is found the *Ahau*-like sign for god D and god D himself is represented in the middle section of the page.

The association of god D with the centipede may be explained by the fact that as this god is regarded as the Moon or Night god, so the centipede is an animal which frequents dark places. Another point in this connection may be made if we consider the head of the centipede in the head-dress and in the glyphs as representing the day sign *Akbal* (Pl. 3, fig. 10) as *Akbal* in Maya means night. It must be admitted, however, that the head might represent the day sign *Chuen* almost as well as *Akbal*. The centipede is connected with death and destruction in the same way as the owl. Both are shown in Vaticanus 3773, 13, associated with the "house of drought."

CRUSTACEA

With one possible exception no crustaceans were found depicted in the Maya codices, but we have introduced figures of two from the Nuttall Codex. The first of these

(Pl. 4, fig. 5) is probably a crayfish, perhaps *Cambarus montezumae*. It seems unlikely that the so-called Spanish lobster (*Palinurus*) can be intended or the powerful spined antennae would have been shown. It is interesting to note that the stalked eyes are clearly pictured. The second example seems to be a crab (Pl. 4, fig. 6). Two large chelae of nearly equal size are simply drawn and four rounded projections at the top of the figure appear to represent the walking legs. Its rotund form and subequal chelae suggest the land crab, *Geocarcinus*, but exact determination is of course impossible. What is certainly a large crab, perhaps of the same species, is shown in Tro-Cortesianus 88c (Pl. 36, fig. 1) in connection with a dog whose feet it seems about to pinch with its two large chelae. The shell is ornamented in a conventionalized way as if with scales.

ARACHNIDA

In Codex Borbonicus 9 (Pl. 4, fig. 4) there is represented a stout-bodied form of spider with two sharply pointed chelicerae projecting from the conventionalized mouth. These characteristics together with the absence of any web, suggest a large predacious species, probably the tarantula (*Tarantula* sp.) which is common in Mexico. The acute powers of observation shown by the artist are evinced in this figure since he draws the spider correctly with eight legs instead of the six or ten sometimes seen in drawings by our own illustrators.

ARACHNOIDEA

The scorpion (Maya, *sinaan*) figures prominently in the Tro-Cortesianus, two drawings from which are shown (Pl. 4, figs. 1, 2). As here conventionalized, the jointed appendages are represented as composed of an indefinite number of round segments. The large chelate pedipalps are also prominently figured but the smaller walking legs are commonly omitted. In Pl. 4, fig. 1, however, there is a pair of posterior chelate appendages which are probably added to give a more

anthropoid cast to the figure. The slight projections along the sides of the body in Pl. 4, fig. 2, probably do not represent the legs. In another drawing (Tro-Cortesianus 44b) these are also present but further reduced so as not to exceed the heavy fringe of spines surrounding the body. In Pl. 4, fig. 1, the fringe alone appears. The formidable nature of the scorpion is of course due to the poisonous sting at the tip of the attenuated abdomen or "tail." In the Maya pictures this portion is usually shown as a grasping organ. Thus in fig. 1 it is similar to the chela and holds a cord by which a deer has been caught. In fig. 2 the "tail" is terminated by a hand. The same thing is seen in Tro-Cortesianus 44b where the hand seizes a cord by which a deer is snared. The scorpion is represented in the drawings with a conventionalized face that is very characteristic. The facial disc is divided into three parts by a median area of straight or irregular lateral boundaries ending anteriorly in two in-turned scrolls suggesting the alae of the nose. A circular eye is present in each of the lateral divisions of the face while from the oral region projects a forked tongue.

It is of course hazardous to attempt a specific identification of these figures but, as pointed out by Stempell (1908, p. 739), there are two large scorpions in Yucatan (*Centruroides margaritatus* and *C. gracilis*) which are probably the species pictured in the codices.

The representations of the scorpion in the Tro-Cortesianus are almost always associated with scenes of the hunt. As the deer is caught in a trap so Förstemann considers that Pl. 4, fig. 1, shows a trap with five appliances, the "tail" one alone being effective. Brinton (1895, p. 75) notes that the Mayas applied the term *sinaan ek*, "scorpion stars" to a certain constellation and suggests that it was derived from the Spaniards. There is certainly some association between the scorpion and water as, in Tro-Cortesianus 7a, the fore and hind legs of the animal enclose a body of water. The scorpion "tail" alone appears in Tro-Cortesianus 31a and 82a as the tail of a god. Its significance is difficult to make out. Destruction is indicated by the scorpion in the Aubin manuscript as suggested by Seler (1900-1901, p. 71).

In the Nuttall Codex there is a remarkably beautiful conventionalization of a scorpion (Pl. 4, fig. 3) in which the tripartite nature of the head is still preserved though it is so reduced as to resemble the calyx of a flower. The "tail", as elsewhere, and the legs are present.

PISCES

Figures of fish (Maya *kai*) occur commonly in the Maya codices in various connections as well as in the stone carvings, but none of these seems certainly identifiable. Among the representations, however, there are clearly several species. One (Pl. 5, figs. 2, 6, 7–9; Pl. 6, fig. 9) has a single dorsal fin, powerful teeth, and a generally ferocious aspect and may represent some large predacious variety, perhaps a tunny. The distinct operculum in most of the figures would preclude their representing a shark. Other figures picture similar fish without the prominent teeth (Pl. 5, fig. 4, 5; Pl. 6, figs. 2, 6, 10, 13). In two cases the scales are diagramatically shown by straight or crescentric lines (Pl. 5, fig. 4, 8). A third species of fish is shown provided with two dorsal fins (Pl. 6, figs. 3, 11; Pl. 7, fig. 6, the last an excellent stone carving). Others (Pl. 6, figs. 7, 14–17) represent fishes without dorsal fins, one of which (fig. 7) from its length may be an eel, possibly *Muraena*.

In the Nuttall Codex occurs a remarkable fish with an unmistakable wing arising just behind the head nearly at the dorsal line. While this may represent a flying fish (*Exocetus*), the head is so bird-like that the whole may be merely a combination figure.

Of frequent occurrence in the Dresden is a glyph, two modifications of which are here shown (Pl. 6, figs. 4, 5). Stempell suggests that the vertical lines on the posterior portion of such figures may be gill slits and that hence they may represent sharks in which these orifices are without an operculum.

As with the molluscs, so with the fish, we naturally find them usually associated with the water. This may be seen especially well in the Nuttall Codex. In Dresden 33a (Pl 6

fig. 13) the fish is clearly associated with the operation of fishing as two figures are seated on the edge of a body of water in the act of casting a net. An eel is shown in the water under god B in Dresden 65b (Pl. 6, fig. 7) and fish are shown just below the claws of a crocodile in text figure 1. In Dresden 44a god B holds a fish in his hands. As will be pointed out later (p. 314) this god is frequently associated with water. In Dresden 44c a fish appears between god B and an unidentifiable deity. In the Maya codices the greater number of representations of fish are in connection with sacrifice. In Dresden 27 (Pl. 6, fig. 6) the fish is pictured resting on two *Kan* signs, the symbol of maize or bread, and these in turn on a flat bowl. In Dresden 29b (Pl. 5, fig. 9) the fish is represented between the red and black numbers of the *tonalamatl*. Here again the fish is shown as an offering.

In two cases only do we find the fish used as a part of the head-dress and in each case the fish is graphically shown as held in the mouth of a heron. One of these is in the Dresden Codex 36b (Pl. 5, fig. 3) and one in the stone carving of the Temple of the Cross at Palenque (Pl. 15, fig. 5). Fish are often represented on the stone carvings as feeding upon a water plant. This is seen in the border at the bottom of the Lower Chamber of the Temple of the Tigers at Chichen Itza (Pl. 5, figs. 2, 4; Pl. 6, fig. 2). In several instances at Copan fish are shown as forming the sides of the Great Cycle glyph at the beginning of an Initial Series (Pl. 6, figs. 14-17). It has often been suggested that as the word fish in Maya is *kai* (usually written *cay*), there may be some phonetic significance here, combining the fish, *kai*, with the usually drum-like sign for stone, *tun*, making *kai tun* or *katun*. This is the term usually given not to the Great Cycle but to the period composed of twenty *tuns* and is probably derived from *kal* meaning twenty and *tun*, a stone.

AMPHIBIA

Frogs. Figures undoubtedly representing frogs (Maya *mutš* or *uo*) or toads are found in several places in the codices

and in the stone carvings, but it is quite impossible to refer them definitely to any of the numerous species occurring in Central America, if, indeed, the artists had any one species in mind. In the Tro-Cortesianus frogs are not uncommon. In 31a there are four (Pl. 7, fig. 1) with water coming from their mouths. They are characterized by their stout tailless bodies, flattened heads and toothless mouths. In 101d (Pl. 7, figs. 2, 3) there are two, the first painted blue with spots of darker blue and the second white and represented as broken in two in the middle. The signs of death above the latter clearly show that a dead animal is indicated. Pl. 7, fig. 6, shows the end of Altar O from Copan on which a frog and a fish are pictured, the former in dorsal view, the latter in lateral aspect. The peculiar pointed snout of this frog is similar to that of the frog shown in Pl. 7, fig. 7, also in dorsal view. A somewhat similar creature (Pl. 29, fig. 6) we have included and though it may represent an opossum it has little to distinguish it from the figures of frogs.*

God B in Tro-Cortesianus 12b should be associated with the frog. His legs are those of a frog and he appears as if swimming in the water. Frog in Maya is *Uo* which is also the name of the second month of the Maya year. The first day of this month, according to Landa, corresponds to August 5 of our year and this is the height of the rainy season in the Maya region. The sign for *Uo* does not, however, resemble a frog in any way. The frog above one of the figures in the Lower Chamber of the Temple of the Tigers at Chichen Itza (Pl. 7, fig. 7) has clearly some relation to the name or totem of the warrior. The Nahua custom is seen here.

Toads are probably intended in Pl. 7, figs. 4, 5. In these the great breadth of the head and mouth together with the short inflated body combine to produce a very toad-like appearance. It is not unlikely that they represent the huge marine toad, *Bufo marinus*, common from southern Mexico to Brazil and in the West Indies. There seems to be no distinction in the treatment of frogs and toads in the codices.

*Attention is also called to two whistles representing frogs in the *Memoirs of the Peabody Museum*, I, *No.* 4 (Gordon, 1898), Pl. 9, figs. i, j.

TREE-TOAD (*Hyla eximia*). Of great interest are the figures in Tro-Cortesianus 26a and b (Pl. 8, figs. 1, 3), showing a god with expanded finger tips and characterized further by the presence of two parallel black stripes from the hinder and lower margins of the eye respectively. The knob-like finger tips at once suggest one of the tree-toads, and the presence of the two lines seems to indicate *Hyla eximia* as the species represented. In this tree-toad there is a long black lateral line running posteriorly from the tympanum and above it a shorter line just as in the drawings. It appears to be a common species in the valley of Mexico though but little seems to have been written of its habits. At the beginning of the rainy season it repairs to pools of water to breed and is then very noticeable from its loud voice. No doubt its importance in the Maya economy was from its conspicuousness at the beginning of the rainy period. This fact is brought out more strongly when we consider that these gods representing the tree-toad are associated with agriculture and the sowing of grain at the beginning of the rainy season. Förstemann (1902, p. 35) identifies these figures as god F. They are quite unlike the usual representation of this god and are clearly god P as Schellhas (1904, p. 39) indicates. It is interesting to note that the two black lines behind the eye are also seen in the other gods shown in Tro-Cortesianus 26a and b although the knob-like finger tips are lacking. The glyph for this tree-toad god is recognized in the fifth place at the top of the same page (Pl. 8, fig. 2) by the same two black lines under and behind the eye.

REPTILIA

SERPENT. It would be impossible in the present paper to enter into any lengthy discussion of the use of the serpent (Maya *kan*) in Mexico and Central America. It seems to be one of the main elements in the religion and consequently in the art of the Mayas and Mexican peoples. It is represented again and again in many forms and varied combinations. It underlies the whole general trend of Maya art. The serpent is often associ-

ated with feathers. The culture hero of the Nahuas, *Quetzalcoatl* (feathered serpent) corresponds to a similar god among the Mayas, *Kukulcan* (also meaning feathered serpent). The feathers of the quetzal are the ones commonly used in connection with the serpent.

Any attempt at identification of the species represented is beset by grave difficulties for so conventionalized have the figures often become that, except in the case of the rattlesnake with its rattles, there are no characteristic marks by which the species may be known. It is natural to suppose that the species used for artistic purposes would be those that are most noteworthy because of their size, coloring, or venomous qualities. No doubt a number of harmless species were also used in the religious ceremonies.* Such may be those used as hair ornaments in many of the figures (Pl. 8, figs. 7–13, 15) and in which no indication of a rattle is to be seen. The fierce eye of these reptiles is shown by means of an exaggerated overhanging brow occasionally embellished by recurved crests (Pl. 8, figs. 10, 11, 13, 15). These crests are sometimes shown as two or three stalked knobs (Pl. 10, fig. 7) that Stempell was misled into identifying as the eyes of snails. Various heads of snakes usually with fangs exposed and tongue protruding are pictured in

*We have added here a Spanish description from the *Relacion de la Ciudad de Mérida* (1900, pp. 66, 67) of the varieties of serpent found in the country. "Ay una suerte de culebra que llaman los naturales taxinchan, de una tercia de largo, que para andar hinca la cabeza en el suelo y da un salto, y de aquella suerte dando saltos anda, la espalda y la cabeza tiene dorada y la punta dela cola este se cria en los montes, y quando pica a alguna persona le haze reventar sangre por todos los poros del cuerpo que pareze que suda sangre y si no es le haze algun rremedio muere dentro de un dia natural y para la mordedura desta culebra tienen por rremedio los naturales dar a bever ala tal persona chile y hoja de piciete molido junto y desleido en agua, y con esto guarecen e sanan—ay biboras muy grandes y ponzoñosas de una vara e mas de largo, y tan gruesa como un brazo, que tienen cascabeles en la punta de la cola, y si muerden matan sino se rremedio con brebedad, y tienen los naturales por rremedio beber chile e piciete como para la mordedura del taxinchan—ay otras suertes de culebras que se llaman cocob, de tres y cuatro varas de largo y tan gruesas como una lanza gineta, que tanbien son muy ponzoñosas, y al que pican haze salir sangre

Pl. 8, figs. 4, 6; Pl. 9, figs. 2, 4–6: one snake with a spiny back is shown in Pl. 8, fig. 5, but obviously it represents merely the artist's endeavor to present as terrifying a creature as possible.

Various types of rattlesnakes are shown in Pl. 9. The presence of the rattle is of course the characteristic, and this portion alone is likewise used, in one case, at least, as a glyph (Pl. 9, fig. 7). It cannot be denied, however, that some or most of the snakes in which no rattles appear, are nevertheless intended for rattlers. It may have been that the figures were so well understood that the addition of rattles in the drawings was quite unnecessary. This, however, is quite conjectural. The species of rattlesnake is probably *Crotalus basiliscus* or *C. terrificus* of southern Mexico and adjacent regions, not *C. horridus* or *adamanteus* as supposed by Stempell since these two species are confined to the United States. Among the figures shown on Pl. 9, it is noteworthy that five of the rattlesnakes show no fangs. Some are spotted, but in a wholly arbitrary manner. Three are unmarked. One is shown coiled about the base of a tree (Pl. 9, fig. 5), another coiled ready to strike though the rattle is pictured trailing on the ground instead of being held erect in the center of the coil as usually is done (Pl. 9, fig. 9). A rattlesnake is shown held in the hand of a man in Pl. 9, fig. 8.

In Pl. 10, fig. 1, is shown a rattle-less snake with prominent fang, coiled about the top of an altar which may represent a tree or bush. From the latter fact, it might be concluded that it was a tree- or bush-inhabiting species,

por todo el cuerpo y por los ojos, como el taxinchan, . . . procuraban guarecerse desta ponzoña con juros y encantamentos, que avia grandes encantadores y tenian sus libros para conjurarlas y encantarlas, y estos encantadores, con pocas palabras que dezian, encantaban y amansaban las culebras ponzoñosas, las cojian y tomaban con las manos sin que les hiziese mal ninguno—tanbien ay culebras bobas sin ponzoñas, de dos varas y mas de largo y tan gruesas como el brazo, y suelen ponerse sobre arboles juntos alos caminos, y quando pasa alguna persona se deja caer encima y se le enrosça y rebuelve al cuerpo y a la garganta, y apretando le procura ahogarle y matarle, a sucedido matar algunos yndios caçadores yendo descuidados—tanbien tienen estas culebras distinto natural para comer y sustentarse."

possibly the deadly "bush-master" (*Lachesis lanceolatus*). Other figures (Pl. 10, figs. 3, 7; Pl. 11, figs. 1, 2) are introduced here as examples of the curious head ornamentation frequently found in the drawings. The two first are merely serpents with the jaws extended to the utmost, and with a characteristic head decoration. The last is provided with an elaborate crest. The size and markings of the two serpents shown in Pl. 11, as well as their want of rattles suggest that they may represent some species of large *Boidae* as *Loxocemus bicolor* or *Boa* (sp?).

After having commented upon the various serpents occurring in the codices and in several other places, we will now take up the manner and connection in which the various figures occur. We shall pass over completely the use of the "serpent column" at Chichen Itza, the importance of the serpent motive in the development of the masked panel as worked out by Spinden, and the countless representations of the plumed serpent in the whole field of Maya design and decoration. In the single Temple of the Tigers at Chichen Itza, the feathered serpent occurs in the round as a column decoration supporting the portico, as carved on the wooden lintel at the entrance to the Painted Chamber, again and again on the frescoes of this room,* in the Lower Chamber as dividing the bas-relief into zones or panels, and, finally, as the center of the whole composition of this bas-relief. It will be seen, therefore, that it will be necessary in a short paper, to limit ourselves to the representations of the serpent in the Maya codices.

The serpent is most frequently associated with god B. Schellhas (1904, p. 17), Fewkes (1894), Förstemann (1906), and Thomas (1882), seem to agree that god B is to be identified as *Kukulcan*, the most important of the deities of the Mayas and, as pointed out before, appearing in the Nahua mythology, as *Quetzalcoatl*, and in the Quiche myths as *Gucumatz*. It was also noted that the name means both in

* Pl. 9, figs. 5, 9, show drawings of the rattlesnake which occur on the fresco.

Maya and in Nahuatl, the "feathered serpent" or the "bird serpent." Other authorities consider god B as *Itzamna*, another of the main gods of the Mayas. Seler interprets god B as the counterpart of the Nahua rain god, *Tlaloc*. It is certain that when god B and the serpent are associated together water and rain are usually indicated. God H, "the *Chicchan* god," also has some relation to the serpent. As pointed out by Schellhas (1904, pp. 28–30), this god often appears characterized by a skin-spot or a scale of the serpent on his temple of the same shape as the hieroglyph of the day *Chicchan* (serpent). The glyph belonging to this deity also shows the *Chicchan* sign as its distinguishing mark. Similar signs appear on the body of the serpent in many places, as in Tro-Cortesianus 30a (Pl. 11, fig. 1).

We have already noted that the serpent, god B, and water are frequently shown together, so the serpent also appears associated with water and rain, when no figure of god B is present. From this connection, it can be argued that there is some relation between the serpent and the coming of the rains. These facts would give strength to the theory that god B is to be identified as a rain god. In Dresden 33a, 35a, god B is seated on the open jaws of a serpent, while the body of the reptile encloses a blue field evidently signifying water. The number nineteen appears on this blue color. It will be noted that there are nineteen spots on the serpents in Pl. 11, figs. 1, 2. In Tro-Cortesianus 3a-6a, corresponding scenes seem to be shown. The body of the serpent encloses water, and here the number eighteen appears in each case. God B occurs always in front of the serpent and his head appears as the head of the reptile in the first instance. In Dresden 35a, 36a, the head of god B is pictured as the head of the serpent in the midst of the water. In Dresden 37b (Pl. 10, fig. 8), B is holding a snake in the water.

Water appears in connection with the serpent and god B in many places in the Tro-Cortesianus. In 9, god B is pictured pouring water from a jar, a common method of showing the idea of rain in the codices. In 12b, B again is shown

perhaps representing a frog, and behind him a serpent. The reptiles in 13b–18b, are all associated with the idea of rain, the turtle and frog also appearing in this section. In 30a (Pl. 11, fig. 1), god B and a female figure are both pouring water from a jar, as they stand on the body of a serpent. In 32a, the black god (L) is seen in the rain, and a serpent is near, while in 32b and 33b (Pl. 9, fig. 1), the serpent forms the belt of god L, and a female figure and water are seen in both cases. The blue color of the snake and of god B in 31b (Pl. 11, fig. 2) may also suggest water.

God B also occurs in connection with the serpent in Dresden 42a (Pl. 8, fig. 14), where the god is seated on the reptile, in Tro-Cortesianus, 10b, where the head of the same god is the head of the snake, and in Tro-Cortesianus 19a, where god B again and god A are each seated on the open jaws of a serpent.

The astronomical role of the serpent is noted in Dresden 56b, 57b (Pl. 10, fig. 3), Tro-Cortesianus 5b, 12b, 15b, and 67b, where the snake is shown in connection with a line of constellation signs, the *kin* or sun sign prominent in most of the drawings. In the "battle of the constellations" in Dresden 60, the serpent appears forming a sort of altar, the seat of a figure which is supported by another figure. A serpent head also appears at the foot of the latter figure.

That the serpent appears associated with the idea of time seems clear from the fact of the long number series in Dresden 61, 62 (Pl. 10, fig. 7), and 69, which are shown in the spaces made by the winding of the serpents' bodies. In Tro-Cortesianus 13a–16a, four large reptiles appear in connection with the lines of day signs.

The study of the serpent used as a head-dress is interesting. As noted previously, quite a different kind of snake seems to be represented when used in this connection. Two other points come out in this investigation, namely, that it is only with female figures that the serpent is employed as a head-dress, and in far the greater number of cases the women are shown, either in the act of offering something, or of pouring water from a jar. The usual type of serpent

head-dress is seen in Dresden 9c (Pl. 8, fig. 11), 15b (Pl. 8, fig. 12), 18a (Pl. 8, fig. 13), 22b (Pl. 8, fig. 10), and 23b (Pl. 8, fig. 8). In the first case, the offering is a jicara or gourd of some sacred drink (*baltše*?), in the second and third examples, the dish is clearly shown, but the offering is unidentifiable, in the fourth case, maize (a *Kan* sign), and in the last, a fish resting on a dish. In Dresden 20a (Pl. 8, fig. 15), a woman with serpent head-dress is seen associated with the Moan-headed figure, possibly in the act of offering it as a sacrifice.

In Dresden 39b (Pl. 8, fig. 7), 43b (Pl. 8, fig. 9), and 70, a similar serpent head-dress is shown on a female figure in the act of pouring water from a jar. In Tro-Cortesianus, the serpent head-dresses differ in type only, and in two out of the four cases where they appear, water is shown flowing from the breasts (30b) of the female figure or from the mouth (32b). The woman thus represented in connection with the water is god I, the water goddess of Schellhas. She is, as he notes (1904, p. 31) usually the figure of an old woman. "Evidently, we have here the personification of water in its quality of destroyer, a goddess of floods and cloud-bursts." We are not at all sure that we have here a distinct god as similar female figures with serpent head-dresses occur frequently in the Dresden Codex with no suggestion of water. The failure to find any distinct glyph for this goddess seems to strengthen the view of not considering her as a separate deity. Finally, in our consideration of head-dresses, the serpent is to be seen in Tro-Cortesianus 79c on the head of the first woman who is weaving. Possibly, a conventionalized serpent forms the head covering of the second figure who is represented as dead.

The serpent in Dresden 26c–28c (Pl. 10, fig. 1) coiled around the altar which rises from a *Tun* sign is not easily explained. In 25c, the altar is replaced by god B and in the former cases, the reptiles may stand for this god with whom they are often associated.* The serpent seems closely

* The reader is also referred to the bas-relief of the Lower Chamber of the Temple of the Tigers at Chichen Itza where a serpent is shown behind a low altar.

connected with the idea of offerings as the body of a snake is shown in several instances as the support of the jar containing the various gifts in Tro-Cortesianus 34a, 34b, 35a, 35b, 36a, 36b, and possibly 52c (Pl. 9, fig. 3).

Finally the serpent is to be noted in a number of miscellaneous connections:—in Dresden 36b (Pl. 19, fig. 11), as being attacked by a black vulture,* in Tro-Cortesianus 40b (Pl. 9, fig. 4) a rattlesnake is biting the foot of one of the hunters, and in Tro-Cortesianus 66b, where the serpent has a human head and arm coming from its open jaws. This is a very frequent method of representing the serpent in the Maya stone carvings. In Tro-Cortesianus 60c, 100d (Pl. 9, fig. 8), twice, 106a, and 111b, the rattlesnake is shown as a sprinkler for the holy water in the hand (in the first, second and fourth examples) of god D. Landa (1864, p. 150)† describes in the ceremony of the baptism of children, that the leader of the rite wore on his head a kind of mitre embroidered with plumage in some manner and in his hand a small holy-water sprinkler of wood, carved skillfully, of which the filaments were the tails of serpents, similar to serpents with rattles.

In spite of the importance of the serpent in the manuscripts and stone carvings, it never seems to appear as a separate deity. With one exception, no glyph is to be found representing this reptile as is the case with many of the animals. Tro-Cortesianus 106c (Pl. 9, fig. 7) is this exception showing the rattles of a snake which are found in the line of glyphs above two of the bees. No serpent appears in the picture.

The Nahuatl day, *Couatl*, has the signification serpent, as suggested before, in discussing the meaning of the name *Quetzalcoatl* or *Quetzalcouatl*. This day sign occurs through-

* Förstemann (1906, p. 15) agrees with Schellhas that this may be a rebus for the name *Quetzalcoatl* or *Kukulcan*. As the bird is a vulture rather than a quetzal this could hardly be the case.

† "Y con isopo en el mano de un palo corto muy labrado, y por barbas o pelos del isopo ciertas colas de unas culebras que son como caxcavales."

out the Mexican manuscripts as the head of a serpent (Pl. 8, figs. 4, 6; Pl. 9, fig. 2; Pl. 10, figs. 2, 4–6).

IGUANA. Of the lizards represented, the iguana (Maya *hu*) is the most striking, and is readily identified on account of the prominent spines along the back. As noted by Stempell, there are two or three species of large lizards in Central America commonly called iguana, and it is probable that the one here considered is the *Ctenosaura acanthura* of Yucatan or *Iguana tuberculata* of South and Central America.

In the manuscripts the iguana is almost exclusively represented as an offering (Pl. 12, figs. 1–6). It is usually found on top of the *Kan* sign, meaning maize or bread,* and this, in turn, resting in a bowl (Pl. 12, figs. 3, 4, 6). Landa (1864, p. 230)† gives a pleasing confirmation of this offering of an iguana with bread. It is possible that the object shown in Tro-Cortesianus 12b (Pl. 12, fig. 13) may be the conventionalized representation of this lizard. It must be admitted that this interpretation is very doubtful. The triangular points suggest the lizard, but the pointed character of the sign as a whole in no way resembles the back of this reptile. It is found associated with three *Kan* signs. In Cakchiquel, a dialect of the Maya stock, *K'an*, according to Guzman and Brinton (1893, p. 24) is the name applied to the female of the iguana or the lizard, and this is believed to be the original sense of the Maya term. It may also be noted that the Nahua day sign *Cuetzpalin*, meaning lizard, is the one which corresponds with the Maya day *Kan*. Pl. 12, figs. 10, 12, 14, show representations of the day corresponding to *Cuetzpalin* in the Aubin and Nuttall codices. These show a stout spineless species with a short thick tail and may be

* Brinton (1893, p. 25) notes that the equivalent of *Kan* in the Nahuatl of Miztitlan is *xilotl* which means ear of corn. This seems to show the correctness of the usual identification of the *Kan* sign as meaning maize or bread (*pan*).

† "Y les ofrecian dos pellas de una leche o resina de un arbol que llaman *kik*, para quemar y ciertas iguanas y pan y una mitra y un manojo de flores y una piedra preciosa de las suyas."

the Gila monster (*Heloderma horridum*), a large and somewhat poisonous species having much these proportions.

Further offerings are shown in Pl. 12, figs. 7, 8. These seem to be the heads and forefeet of lizards, but, from the shape of the head, perhaps not of iguanas.

In Stela D of Copan, the *Uinal* period glyph seems to be represented by a spineless lizard covered with scales (Pl. 12, fig. 9). Frog-like characteristics also appear. This stone monument is remarkable from the fact that the glyphs are all more or less realistic representations of human and animal forms. It should be noted that there certainly seems to be some connection between the *Uinal* period glyph and the lizard. Pl. 13, fig. 9, represents a *Uinal* glyph from the Temple of the Foliated Cross at Palenque and the lizard form is clearly seen in the eyebrow and the upper jaw. Compare also Pl. 13, fig. 11, and Pl. 28, fig. 3. A collection of glyphs of this period shows clearly the lizard-like character of the face.

That some connection existed between the lizard and the idea of rain seems clear from a reference in the *Relacion de la Ciudad de Merida* (1900, p. 51).* Finally the lizard is shown in Dresden 3a (Pl. 12, fig. 11) directly in front of god H beside the scene of human sacrifice.

CROCODILE. The text figure (1) shows a dorsal view of a crocodile (Maya, *ayin*) carved on the top of Altar T at Copan. The general form is considerably conventionalized with limbs elongated and provided with human hands and long toes. The protuberances of the back are roughly shown by oval markings, which are here continued on the legs. The large scales of the ventral surfaces also appear at the sides of the body, and along the posterior edges of the limbs. The tail is shortened and bifurcate. The most interesting portion, however, is the head. The snout is distinctly pinched in at the base, though broadened again distally. In the alligator the snout is broad and tapers but

* "Y pintaban un largarto que significaba el Diluvio—y la tierra e sobre este largarto hazian un gran monton de leña y ponianle fuego."

little. As in other representations of the crocodile, the lower jaw does not appear, and even in this dorsal view the artist seems to have deemed it necessary to show the row of teeth as if in side view, or as though they projected laterally from the mouth. What may represent ears or ear plugs are shown one on each side behind the eyes. There are few other examples of full drawings of the crocodile in the Maya writings.

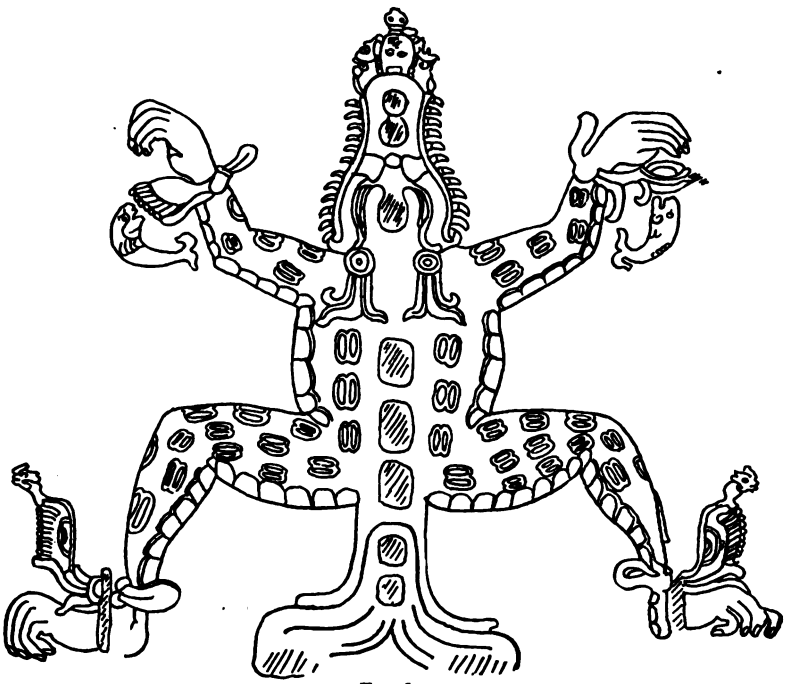

FIG. 1.
TOP OF ALTAR. T. COPAN.

Dresden 74 shows an animal which has been considered to represent a crocodile or alligator but it seems to have more of the characteristics of a lizard.

Figures of a crocodile (*Crocodilus americanus*) are frequent in the Nuttall Codex, where there is one large figure of the entire animal (Pl. 13, fig. 8), making its way along under water. It is shown with numerous dorsal spines, a long tail,

and powerful claws. Curiously, however, it has no lower jaw and the same is true of the numerous glyphs representing the head of the animal. This is so pronounced a characteristic, that it may be doubted if the open-mouthed head and the single limb shown in Pl. 13, fig. 2, really picture the same animal, though otherwise apparently referable to the crocodile. In the various glyphs showing the head of this species, the prominent, elongate eyebrow and the absence of the lower jaw are noteworthy points, while the teeth may vary in number from three to six.

The glyphs (Pl. 13, figs. 1, 3–7) represent the Nahua day sign *Cipactli* corresponding to the Maya day *Imix*. In the band of constellation signs in Dresden 52b (Pl. 13, fig. 10), there occurs a single figure with a long curled eyebrow and lacking the lower jaw. In the upper jaw three teeth are indicated. A comparison of this figure with the glyphs in the Nuttall Codex seems to leave little doubt that it represents a crocodile. This is the sign which Förstemann (1906, p. 206) interprets as standing for Saturn. Pl. 13, fig. 12, is certainly the same sign as it stands in relatively the same position in the constellation band on Dresden 53a. It represents the highly conventionalized head of a crocodile. On Stela 10 from Piedras Negras (Maler, 1901–1903, Pl. 19) the same glyph is seen.

The range of the alligator in North America does not extend to Yucatan, hence the crocodile, which does occur there, is taken as the original of all these figures. There is nothing in the latter that would distinguish it from the alligator.

Turtles. Representations of the turtle (Maya, *ak*) are not uncommon among the Mayas. At Uxmal there is a ruined building called *Casa de las Tortugas* on which at intervals around the cornice there are carvings of turtles. Turtles of at least two species occur in the Tro-Cortesianus. With one exception, they seem to be limited to this codex. That shown on Pl. 14, figs. 1–3, 5, is a large species with the dorsal scutes represented by large diamond-shaped pieces. There is little

that might be considered distinctive about these turtles, although one (Pl. 14, fig. 5) has the anterior paddles much larger than the posterior, indicating a sea turtle. What is doubtless the same turtle is pictured in several places in the Nuttall Codex. In one of the figures in the latter manuscript, the shell is shown apparently in use as a shield (Pl. 14, fig. 4). This would indicate one of the large sea turtles, and there is not much doubt that either the Loggerhead turtle (*Thalassochelys cephalo*) or the Hawksbill (*Chelone imbricata*) is here intended.

Quite another species is that shown in Pl. 14, fig. 6. That this is a freshwater turtle is plainly indicated by the parasitic leeches that are noted fastened by their round sucking-discs to the sides of its body. The long neck, pointed snout, and apparent limitation of the dorsal spinous scutes to the central area of the back may indicate the snapping turtle (*Chelydra serpentina*) or possibly a species of the genus *Cinosternum* (probably *C. leucostomum*). It is hardly likely that it is one of the true soft-shelled turtles (*Trionyx*), as the range of that genus is not known to include Mexico. The turtle from Nuttall 43 (Pl. 14, fig. 11) may belong to the same species as its scutes seem rather few, or it may be that the view shown here is of the ventral side and that the scales indicate the small plastron of one of the sea turtles.

The turtle appears alone as one of the figures in the *tonalamatl* in several cases in the Tro-Cortesianus, 13a, 17a (Pl. 14, fig. 3), 72b (Pl. 14, fig. 6). It is found associated with the toad appearing in the rain in Tr_o-Cortesianus 17b (Pl. 14, fig. 2) and alone in the rain in 13a. In Tro-Cortesianus 81c (Pl. 14, fig. 5), it appears in front of an unidentifiable god.

Schellhas has called the turtle an animal symbolical of the lightning basing his opinion, as Brinton (1895, p. 74) tells us, on Dresden 40b where a human figure with animal head is holding two torches in his hands. This figure does not seem to us to represent a turtle, as is commonly supposed, but a parrot, as will be pointed out later (p. 343). Förste-

mann (1902, p. 27) identifies the turtle with the summer solstice, as has been noted before, explaining that the animal is slow of motion, and is taken to represent the time when the sun seems to stand still. He bases his theory (1904, p. 423) in part on the fact that the sign for the Maya month *Kayab*, which is the month in which the summer solstice occurs, shows the face of the turtle (Pl. 14, fig. 10). This undoubtedly is correct, but he seems to us wrong in classing as turtles the figure in Dresden 40b (Pl. 25, fig. 1) with its accompanying glyph (Pl. 25, fig. 6).

The turtle is found in connection with two sun (*kin*) signs beneath a constellation band in Tro-Cortesianus 71a. Resting upon his body are three *Cauac* signs. The single representation of the turtle in the Dresden Codex is on page 49 (Pl. 14, fig. 12) where a god is pictured with a turtle's head. The heavy sharp beak indicates that he represents one of the sea turtles previously mentioned. He is shown transfixed by a spear and corresponds to the other figures in the lower parts of pp. 46–50. These all have some connection with the Venus period which is considered in these pages.*

A number of glyphs representing the turtle are found throughout the codices (Pl. 14, figs. 7–10). They are all characterized by the heavy beak. It may be noted that these glyphs are virtually the same as the sign for the first *a* in Landa's alphabet. As the turtle is called *ak* or *aak* in Maya, the reason is clear for the selection of this sign for an *a* sound. These turtle glyphs often occur alone; one, however, (Pl. 14, fig. 7) is found in connection with the swimming turtle in Tro-Cortesianus 17a (Pl. 14, fig. 3). Figs. 7–9 agree in having the small scrolls at the posterior end of the eye. The head shown in Pl. 14, fig. 10, has quite a different eye, though otherwise similar. Its resemblance to the glyph on Pl. 25, fig. 9, is marked and suggests the parrot. Schellhas (1904, p. 44) gives in his fig. 64, a glyph for the turtle which seems clearly to be a glyph for the parrot (Pl. 25, fig. 7).

* See in this connection Seler, 1904.

AVES

HERONS (*Ardea herodias; Hydranassa tricolor ruficollis*). Only a few water birds are shown in the Maya works. Several are found, however, that seem to picture herons (Pl. 15, figs. 1–7). The best of these (fig. 5), a carving from the west side panel of the Temple of the Cross at Palenque shows a crested heron standing on one foot and holding in its bill a fish. A second figure (Pl. 15, fig. 1) is from the stucco ornament from the Palace. House B, at Palenque. It is less carefully executed, but seems to be a long-necked bird with a crest and outspread wings curiously conventionalized. In the Nuttall Codex there is another unmistakable heron (Pl. 15, fig. 4) with the same general characteristics, though the crest is less prominent, here represented as a series of erectile feathers separated at their tips. This elongation of the crest seems to be carried still farther in what seems to be the head and neck of a heron from Dresden 37b (Pl. 15, fig. 3) with erectile feathers at intervals along its length.

The heron is seldom employed as a head-dress. In the Lower Chamber of the Temple of the Tigers at Chichen Itza, one of the warriors wears a bird head-dress (Pl. 15, fig. 2), which from the length of the bill is probably made from a heron's head, though the crest seems greatly exaggerated. The bas-relief on which this is found is strongly Nahua in feeling and execution. This head covering may indicate, according to the Nahua fashion, the tribe to which the warrior belongs. Again in Dresden 36a (Pl. 15, fig. 7), a man is shown wearing as a head-dress the head and neck of a heron that holds in its bill a fish. This head resembles very closely that of the heron in fig. 1. What appears to be a similar head is shown in Pl. 15, fig. 6. It is interesting to note that the heron with a fish (Pl. 15, fig. 5) from Palenque also forms a part of a complicated head-dress.

It is, of course, uncertain to which of the several herons occurring in Central America these representations refer. Possibly the Great Blue heron (*Ardea herodias*) or the Louisi-

ana heron (*Hydranassa tricolor ruficollis*) is intended. It seems not unlikely also, that one of the white egrets may be shown as their crests are fairly conspicuous.

FRIGATE-BIRD (*Fregata aquila*). We have included here two figures (Pl. 15, figs. 8, 9) that undoubtedly represent a single species of bird. It is characterized by a deeply forked tail and long beak, which has part way on its length, a circular object surrounded by a circle of dots. It seems still problematical what this object may be. In one figure (fig. 9), the beak is strongly hooked, in the other (fig. 8) it is straight, but as the latter is plainly a much more carelessly made drawing, we may infer that the hooked bill is more nearly correct. This would exclude the Terns (*Sterna*), to which Stempell has referred the figures. It seems probable that the frigate-bird (*Fregata aquila*) is the species intended, as this is not only a large conspicuous form on these coasts, but it has a long and strongly hooked beak and forked tail. The length of the beak would probably exclude from consideration, the swallow-tailed kite that also occurs in the region.

Both these birds are pictured, evidently as an offering or sacrifice. It is very seldom that the whole bird is represented in this connection, and still more infrequent to find anything but the turkey, which is the usual bird of sacrifice. The figure from the Dresden Codex (Pl. 15, fig. 9) rests upon the usual bowl or jar, that from the Tro-Cortesianus (Pl. 15, fig. 8) is pictured upon a grotesque animal head, three *Kan* signs and these upon the jar.

In the Tro-Cortesianus 20c, 21c, there occur several representations of man-like forms with very peculiar heads. The latter are each provided with a beak-like projection, on which appears the circle surrounded by dots noted above in connection with the frigate-bird. Brinton concludes that this mystic symbol is a representation of the curious knob on the bill of the male white pelican, and therefore identifies these curious figures as pelicans. Stempell follows Brinton in this, but considers that they are the brown pelican (*P.*

fuscus), since the white pelican is rare or casual, as far south as Yucatan. Unfortunately, however, for this supposition, the brown pelican lacks the curious knob that Brinton believed to be represented by the circle of dots. Moreover, this same sign occurs on the drawings of the bills of the frigate-bird and the ocellated turkey, and is evidently not of specific significance. To our minds it is doubtful if the figures under discussion are birds at all, and we are unable to assign them a name with any degree of confidence. A peculiar glyph occurs in connection with them which may be an aid to their ultimate identification. Brinton calls the glyph the "fish and oyster sign."

Ocellated Turkey (*Agriocharis ocellata*). This turkey (Maya *kuɔ*) is an important species in the Maya economy, and is seen frequently in the manuscripts. This is a smaller bird than the more northern true turkey (*Meleagris*) and is characterized by the presence of curious erect knobs on the top of the naked head. These are shown in conventionalized form in the various figures (Pl. 16), and afford a ready means of identification. On the bill of the bird shown in Tro-Cortesianus 10b (Pl. 16, fig. 2) occurs again the curious symbol, a circle surrounded by dots, previously noted under the frigate-bird and pelican. It probably has some special significance. Other figures of ocellated turkeys show but little in addition to the points just discussed. One shown in Pl. 16, fig. 7, from Codex Vaticanus 3773, however, has a circular ring about the eye and the wattles are indicated as projections merely. In fig. 13, they are apparently shown as stalked knobs found elsewhere in connection with serpent head ornaments. It is only the head in this latter figure which is considered in this interpretation.

In the Nuttall Codex, there frequently occur representations of a bird that was evidently used for sacrificial purposes. It is shown with erectile head feathers and a ring of circular marks about the eye (Pl. 26, figs. 12, 14; Pl. 27, figs. 2–3) or with concentric circles (Pl. 27, fig. 1). These figures are

not surely identifiable, but probably represent this turkey. Possibly they are the chachalaca (*Ortalis vetula pallidiventris*), a gallinaceous bird, commonly kept in semi-domestication in Mexico, whose bare eye ring and slightly erectile head feathers may be represented by the drawings. It is probable that this turkey is the bird represented frequently in the Maya codices as a bird of sacrifice. The head alone usually appears in this connection, among other places, in Dresden 34a (Pl. 16, fig. 10), 41c (fig. 14), 29c (fig. 16), 28c (fig. 17), and in Tro-Cortesianus 12b (Pl. 16, fig. 11), 105b (fig. 12), 107b (fig. 15). In several of these places the head is represented as resting on one or more *Kan* signs, again meaning bread, as well as on the vessel or jar. In Dresden 26c (Pl. 16, fig. 9), the whole turkey is pictured as an offering, as in the preceding case noted in Dresden 35a (Pl. 15, fig. 9). The whole bird as an offering may also appear in Tro-Cortesianus 4a (Pl. 16, fig. 4) corresponding to the offering of venison and iguana on the following pages. This representation of the entire bird is very rare although the fish, when used as an offering, is always represented as a whole and the iguana is in most cases when used in the same connection. Landa (1864, p. 222)* confirms the offering of the heads of birds with bread.

It is, however, the sacrifice of a bird, probably a turkey, by decapitating, that is especially interesting, as the operation as shown in the Dresden Codex 25c (Pl. 26, fig. 2), 26c, 27c, 28c, in the rites of the four years, is described in full by Landa. In the codex, a priest is represented as holding in his hand before an altar, a headless bird. Landa (1864, pp. 212, 218, 224, 228)† tells us that in the *Kan*, the *Muluc*,

*"Y ofrecerle cabeças de pavos y pan y bevidas de maiz."

†(Kan year) "Sahumavan la imagen, degollavan una gallina y se la presentavan o offrecian . . . y assi le hazian muchas offrendas de comidas y bevidas de carne y pescado, y estas offrendas repartian a los estrangeros que alli se hallavan."

(Muluc year) "Y despues degollavanle la gallina como al passado."

(Ix year) "Y degollavan la gallina . . . a la estatua de *Kac-u-Uayeyab*

the *Ix*, and the *Cauac* years, the priests burnt incense to the idol, decapitated a "*gallina*" (undoubtedly a turkey), and presented it to the god.

The turkey is also used as a head-dress. Only in one case, however, Tro-Cortesianus 95c (Pl. 16, fig. 5), is the whole bird represented in this connection. This is clearly of totemic significance here, as it occurs in that part of the codex where birth and infant baptism are shown. In many other places there are curious partial representations of bird heads in the front of head-dresses which may or may not be identified as heads of turkeys. Among these are the head-dress of god H in Dresden 7c, of god E in Dresden 11c, of god C in Dresden 13b, of god A in Dresden 23c, and a female divinity in Dresden 20a (Pl. 16, fig. 13). Schellhas (1904, p. 43) identifies these birds as vultures.

That the turkey is connected with the rain seems clear. This is especially the case among the Nahuas. In the Aubin manuscript the rain god, *Tlaloc*, often appears in the disguise of the turkey-cock (*uexolotl*), and in the Vaticanus 3773, 14, the turkey (Pl. 16, fig. 7) is represented in the "House of Rain," in contrast to the owl shown in the "House of Drought" (Seler, 1902–1903, p. 75). It might be noted also that Fewkes (1892, p. 228) shows that the turkey is emblematic of the rain among the pueblo peoples. The same idea seems to be present among the Mayas, as we note in the Tro-Cortesianus 10b (Pl. 16, fig. 2) the turkey is pictured in the rain and surrounded on three sides by bands of constellation signs.

Two methods of capturing the turkey are shown in the Tro-Cortesianus 93a and 91a (Pl. 16, figs. 1, 3). By the first, the bird is captured alive in a sort of wicker basket, which drops over it at the proper moment. The second method is by the "twich-up" or snare, which consists of a

ofrescian una cabeça de un pavo, y empanados de codornices y otras coasa y su bevida."

(Cauac year) "Como solian y degollavanle la gallina . . . un hombre muerto y en cima un paxaro cenicero llamad *kuch*, en señal de mortandad grande, ca por muy mal año tenian este."

noose tied to a bent sapling and properly baited. In connection with Pl. 16, fig. 1, it may be suggested that possibly this represents a cage rather than a trap, in which the bird is confined. The Lacandones at the present time often keep their totem animals in captivity (Tozzer, 1907, p. 40).

KING VULTURE (*Sarcorhamphus papa*). Numerous figures of vultures appear in the codices and elsewhere. Indeed, they are among the most common of the birds depicted. Two species only seem to occur in the writings, the king vulture and the black vulture. The former is a large black and white bird with the head and the upper part of the neck unfeathered, except for numerous short, almost bristle-like plumules. These naked portions are often colored red and there is a large more or less squarish fleshy knob at the base of the upper ramus of the beak. This conspicuous protuberance has been seized upon as a characteristic in the conventionalized figures, and serves to identify the king from the black vulture. In addition, a series of concentric circles about the eye seems to be a rather constant mark of the king vulture, though they are also sometimes found in connection with figures which, from the absence of the rostral knob, must represent black vultures (Pl. 18, figs. 18, 27; Pl. 19, figs. 7, 10, 11). In the case of the bird shown in Pl. 19, fig. 1, the knob is hardly apparent, and the same is true of Pl. 19, fig. 13. Both these may represent king vultures. A remarkable figure is that shown in Pl. 17, fig. 4, in which an ocellated turkey and a king vulture confront each other with necks intertwined. The short hair-like black feathers of the head are represented in this as well as in Pl. 17, fig. 11, and in the glyph carved in stone (Pl. 17, fig. 10), which from the presence of the knob is probably a king vulture. The characteristic knob is shown in a variety of ways. Thus, in Pl. 17, fig. 1, it is greatly developed and resembles a large horn with a falcate tip. In Pl. 17, fig. 4, it is sharply angular and nearly square. Frequently, it is a circle with a centered ring surmounted by one or two additional rings or terminated by a mitre-shaped structure (Pl. 17, figs. 2, 5–7, 8–12). A

very simple form was found in the carving shown in Pl. 17, fig. 13, where a long projecting knob is seen at the base of the culmen.

The king vulture seems to have a part to play as a mythological being, as it is pictured as a god with human body and bird head in the act of cohabiting with a woman in Dresden 19a, and with a dog in Dresden 13c (Pl. 17, fig. 3). Moreover, the same vulture god is represented on a blue background and under a band of constellation signs in Dresden 38b, and is also to be noted in Dresden 8a. Förstemann (1906, p. 66) shows that the thirteenth day of the Maya month is reached in the *tonalamatl* reckoning at this place. This day is *Cib*, which corresponds to the Nahua day *Cozcaquauhtli*, which has the meaning vulture, and here, as previously noted, the vulture god is represented. In Tro-Cortesianus 22c (Pl. 17, fig. 2) and 10a,* the king vulture appears alone, in the first instance with a blue background, and in the second with a background representing rain. Rain is also shown in connection with the vulture god in Dresden 38b, and the black vulture in Tro-Cortesianus 18b (Pl. 19, fig. 13).

The king vulture is found employed as a head-dress twice out of the three times it appears in any connection with female figures, Tro-Cortesianus 26c (Pl. 17, fig. 12) with male figure, and 94c (Pl. 17, fig. 11) and 95c with female figures. The last two clearly have to do with the baptism and naming of infants, as previously explained.

The study of the glyph used to indicate the vulture is interesting, for we find it recurring again and again throughout the Maya codices and often when there is no other drawing of the animal, as in Dresden 39c (Pl. 17, fig. 5; Pl. 18, fig. 19). The first example (glyph 6) is clearly the head of the king vulture, whereas the second (glyph 3) is probably the head of the black vulture. The glyph in Dresden 38b (Pl. 17, fig. 7) appears in connection with the vulture god directly below it. In Dresden 11b (Pl. 18, fig. 1), it occurs alone and

*Förstemann identifies this bird as a black eagle.

no figure appears in the usual place below. The *Tun* period glyph (Pl. 17, fig. 10) frequently shows vulture characteristics especially in the nostril of the face. The teeth, however, often appearing in the *Tun* glyph would be against this theory. The blending of bird and mammal characteristics is not uncommon in the Maya drawings, however.

The Nahua day sign, *Cozcaquauhtli*, as previously noted, has the meaning vulture, and we naturally find this bird frequently represented in the Mexican codices. In the Nuttall Codex, the head of the king vulture occurs repeatedly as a glyph for this day. In its less modified forms (Pl. 18, figs. 2–4), the beak is merely a pair of flattened rami, surmounted proximally by the conspicuous quadrangular knob. The minute hair-like feathers on the otherwise naked head are shown as a fringe at the throat and crown, while a conventionalized ear is represented posteriorly. A series of interesting figures (Pl. 18, figs. 5–10) illustrates steps in the further reduction of this head to a small glyph in which only the beak with its large squarish knob remains (Pl. 18, fig. 10).

Black Vulture (*Catharista urubu*). It is difficult to assign any single characteristic to the figures representing the black vulture (Maya, *tṣ̌om*) other than the long raptorial beak. A number of drawings probably depict black vultures, though this cannot be certainly affirmed. Such are those shown in Pl. 18, figs. 11, 12, 14, 17; Pl. 19, figs. 2–4, 13, 14. Stempell considers the vulture shown in Pl. 18, fig. 13, to be a king vulture, but it has no knob on the beak, and thus is quite likely the black vulture. The fact that its head is shaped much like that of the god with the king vulture head (Pl. 17, fig. 3) would indicate merely the individuality of the artist. The coloring of the species under discussion is uniformly black in the Dresden and Tro-Cortesianus, except in certain cases where the birds are shown in outline only, as in Pl. 19, fig. 12. It is not certain, however, that these two last are black vultures, though they suggest the species. The two birds shown in Pl. 19, figs. 5, 6, are almost surely black vultures, and, as represented in the manuscript, are descending

upon a man. Stempell thinks they may be ravens, but this is very doubtful, for the raven probably was unknown to the Mayas, since its range is to the northward. What appears to be a crest is seen on the head of the bird in Pl. 19, fig. 4. The black coloring and the shape of the bill otherwise suggest the black vulture, though perhaps the crest would indicate the harpy eagle. Similarly, Pl. 19, fig. 14, is provided with a sort of tuft or crest, but its general appearance is suggestive of the vulture. A pottery whistle (text fig. 2) from the Uloa Valley evidently represents a black vulture. The head of the bird shows the characteristic wrinkled appearance seen

FIG. 2.
POTTERY WHISTLE, VULTURE. ULOA VALLEY, HONDURAS.

in the drawings, with the heavy beak. The absence of the rostral knob would preclude its being a king vulture.

It is natural that this bird should find an important place in the Maya writing, as it is an abundant species in the region considered, and of great importance as a scavenger. The black vulture seems to lack the mythological character associated with the king vulture. It appears usually in connection with death and in the role of a bird of prey. This is especially true in the Tro-Cortesianus where in 24d, 26d (Pl. 19, figs. 5, 6) and 28c, it is attacking a human being, in the first and last cases represented as dead. In 86a and 87a, the bird is shown plucking out the eye of a man. In

Dresden 3a (Pl. 19, fig. 7), it appears at the top of the tree above the human sacrifice and seems to be in the act of consuming the victim. In Tro-Cortesianus 91c, it also appears in a tree. In Tro-Cortesianus 40a (Pl. 17, fig. 9), and 42a (Pl. 19, fig. 1), it is shown as eating the entrails of a deer. In the first case, the bird looks like a king vulture, although this is the only instance where this species is shown as a bird of prey. In Tro-Cortesianus 28b and 36b (Pl. 18, fig. 17), the black vulture appears eating the *Kan* sign. In the first example, the *Kan* represents the newly sowed corn, in the second, the *Kan* is held by god F. Landa (1864, p. 230)* records that in the *Cauac* year there was a ceremony to prevent the ants and the birds devouring the corn. In Dresden 34b and 35b, the vulture is shown on top of the head-dress of god F, evidently the enemy of the harvest and, again, on 35b (Pl. 19, fig. 4) on top of the *Cauac* sign. Its role as a bird of prey is further shown in Dresden 36b (Pl. 19, fig. 11), where it is shown attacking a serpent.

This vulture is associated with god B in Dresden 69b, with god M in Tro-Cortesianus 70a (Pl. 18, fig. 12), and with god D in Tro-Cortesianus 67a (Pl. 17, fig. 1). The last may be the king rather than the black vulture, as suggested above. The black vulture occurs only once as the usual head-dress, in Dresden 17b (Pl. 18, fig. 13), and here in connection with a female figure and the idea of birth. Two birds, probably vultures, appear over the enclosure around the head of god C in Tro-Cortesianus 100b (Pl. 19, fig. 12). In the Lower Chamber of the Temple of the Tigers occurs a black vulture in bas-relief with a necklace represented (Pl. 19, fig. 14).

The glyph of the king vulture has already been discussed. There are other glyphs which seem to show the black vulture, although it is quite possible that no sharp distinction was

*"Este año en que la letra era *Cauac* y reynava el *Bacab-Hozanek* tenian, allende de la pronosticada mortandad, por ruyn, por que dezian les avian los muchos soles de matar los maizales, y comer las muchas hormigas lo que sembrassen y los paxaros, y porque esto no seria en todas partes avria en algunos comida, la qual avrian con gran trabajo."

made between the two in regard to the glyphs at least. In one case (Pl. 18, fig. 18), the wrinkled skin of the head and neck is indicated much as in the case of the king vulture. A few other glyphs are shown (Pl. 18, figs. 16, 19, 22, 27), as well as a variety from the Nuttall Codex in which the minute hair-like feathers of the head are variously represented, usually much exaggerated as a sort of crest or comb. Pl. 18, fig. 22, is interesting as being the only case in the Maya codices where the whole figure is shown in the glyph. As noted in the case of the glyphs of the king vulture, the greater number of these occur quite alone. They seem to indicate that a full drawing of the bird is meant to be understood as occurring below.

Several of the carved glyphs (Pl. 19, figs. 8–10) show the black vulture heads in some detail with the conspicuously open nostril and hooked beak. A carving of the entire bird may be shown on Stela D from Copan (Pl. 28, fig. 5), where the naked head and neck are marked off by lines indicating wrinkled skin. The same lines on the neck of the bird depicted on Pl. 28, fig. 2, will probably identify it as a vulture, and, if the square ornament above the beak certainly is part of the figure, it is unquestionably the king vulture. The knob is not, however, clearly on the bird's beak. There are two interesting glyphs which occur on the eastern façade of the Monjas at Chichen Itza. The glyphs in this inscription are unlike the usual Maya hieroglyphs, although several of the so-called constellation signs can be made out. The two glyphs in question represent the entire body possibly of a vulture, that on Pl. 17, fig. 13, probably the king vulture, and that on Pl. 18, fig. 14, the black vulture.

HARPY EAGLE (*Thrasaetos harpyia*). In the Nuttall Codex, what is undoubtedly the harpy eagle is of frequent occurrence. This great bird is not uncommon in the forests of southern Mexico and Central America, and must have attracted the notice of the people from its size. The elongated feathers at the back of the head form a conspicuous crest, a feature that characterizes this species in most of the

representations. A stone carving from Chichen Itza (Pl. 20, fig. 10) pictures a harpy eagle eating an egg-shaped object, and another similarly engaged is copied from the Codex Vaticanus 3773 (Pl. 20, fig. 14). The former is considered to be a vulture by Maudslay, but the presence of feathers covering the head excludes this interpretation. In two stone glyphs (Pl. 20, fig. 1, 3), occurs a large bird apparently devouring something held in its talons, as in Pl. 20, fig. 10. From this general resemblance, it seems probable that both represent the harpy, although no crests are shown on the glyphs. In the Dresden and the Tro-Cortesianus occur a few figures of crested birds that probably are the same species. The crest feathers are reduced to two, however, or, in some cases, what may be a third projecting forward from the base of the bill (Pl. 20, figs. 5, 7, 12, 13). The last two figures are not certainly identifiable, though it is probable that they represent the harpy.

The eagle seems to be the bird associated with warriors in the codices. Seler (1900–1901, p. 89) notes that the eagle and the jaguar are both the mark of brave warriors among the Nahuas. In the Aubin manuscript, the warrior god, *Yaotl*, is always associated with the eagle (*quauhtli*). In the Maya pantheon, god M is usually considered the war god, as he is almost always armed with a spear. He is seen in Dresden 74 (Pl. 20, fig. 13), and in Tro-Cortesianus 109c with an eagle as a head-dress. There are other gods, however, who wear a similar head covering. God L appears in Dresden 14b (Pl. 20, fig. 7) and again in 14c (Pl. 20, fig. 5) with an eagle head-dress. God D in Dresden 23c (Pl. 20, fig. 11) has an eagle coming from a *Tun* sign on top of his head. The eagle is probably represented at the prow of a boat in Dresden 43c (Pl. 20, fig. 12) in which god B is rowing. In Tro-Cortesianus 88c (Pl. 20, fig. 4), a bird which may represent the eagle appears sitting on a *Cimi* (death) sign. Above in the glyphs the character for the south is shown. Here, clearly, there is some connection between the signs of the cardinal points in the line of glyphs and the various creatures pictured below.

There seems to be only one glyph which can in any way be taken for that of the eagle in the Maya manuscripts and this appears only once, in Tro-Cortesianus 107c (Pl. 20, fig. 9). This identification may be questioned, as there is no drawing of an eagle associated with the glyph. Attention has already been called to the two stone glyphs in Pl. 20, figs. 1, 3. There are various drawings of the glyph for the eagle in the Nahua and Zapotecan codices (Pl. 20, fig. 8), as the Nahua day, *Quauhtli*, has the meaning eagle. It is interesting to note in the glyph from the Nuttall Codex (Pl. 20, fig. 8) the tips of the feathers are crowned with stone points, a frequent way of representing birds of prey among the Mexican peoples.

YUCATAN HORNED OWL (*Bubo virginianus mayensis*). Stempell makes a serious mistake by confusing the eared owl shown in full face with that shown in profile in the drawings, for he considers both to represent the great horned owl. The figures are, however, quite different in every way. The owl in full face view is unquestionably the great horned owl (Maya, *ikim*), the Yucatan form of which is recognized by the subspecific title *mayensis*. This is the bird opposed to the "Moan-bird" which, as will be shown later, is associated with death. In Pl. 21 are some truly remarkable figures which seem to represent this horned owl, the first modelled in stucco from Palenque, the second carved in stone from Yaxchilan, and the third carved in wood from Tikal. Figs. 1 and 3 show the bird in flight with extended wings. The two erectile tufts of feathers or "horns" are conspicuously represented in fig. 3, at either side of the bird's head and between them the flat top of the crown is secondarily divided in like manner into three parts, representing the "horns" and the top of the head. The beetling brows, heavy hooked beak, and spread talons combine to give a fierce and spirited mien to the great bird. Pl. 21, fig. 2, may be a greatly conventionalized owl in which the essential characteristics of the bird are reproduced in a rectangular design. The large bill is conspicuous in the center, and in each upper corner terminates one of the ears. The eyes are represented by

rectangular areas at the base of the bill, each with three vertical bars across it. Below the beak, or at either side of the tip, are the feet, each with the claw cross-hatched. What seem to be the reduced and highly conventionalized wings fill the lower corner of each side of the figure.

The shield in the center of the Tablet of the Sun at Palenque (Pl. 22, fig. 6) shows a face in which the motif seems to be the full-face view of the horned owl. The hooked bill curves over the mouth at each side of which is the curious scroll seen in the same connection in the figures of Pl. 21. The ears are somewhat shorter in proportion than usual and below each, at the sides of the face, is a large ear-plug, similar to that elsewhere found. The eyes are still further conventionalized with a decorative scroll surrounding each. Another example of the conventionalized owl's head is on Stela 1 from Cankuan (Maler, 1908, Pl. 13). We are not yet ready to advance an explanation of the reason why the owl should occupy such a prominent position in the art of the Mayas.

In only one case is the horned owl found in the Maya manuscripts. In Tro-Cortesianus 95c (Pl. 22, fig. 2), this owl appears as the head-dress of a woman in that portion of the codex where baptism and naming are shown. An owl's head seems to be shown on the end of a warrior's staff in the bas-relief of the Lower Chamber of the Temple of the Tigers at Chichen Itza (Pl. 22, fig. 4). Pl. 22, figs. 5, 7, show two owls from the Aubin manuscript; the first is considered to be the screech owl (*chiqualli*) and the second the horned owl (*tecolotl*, in Nahuatl). Pl. 22, figs. 1, 3, show two drawings of owls from Nahua manuscripts.

YUCATAN SCREECH OWL or MOAN BIRD (*Otus choliba thompsoni*). A second species of owl is represented by the figures on Pl. 23. This has likewise two feathered tufts or "ears" on its head and is always shown with the head, at least, in profile, but the tufts one in front, the other at the back of the head. The facial disc is not very prominent the beak rather long, the tail short, and the plumage some-

what mottled. A dark ring usually surrounds the eye. It is, with little doubt, the screech owl, the only other form of eared owl commonly met with in the Central American region, and in Yucatan is represented by the race above indicated. This owl, under the name of the Moan bird,* is always associated with the idea of death among the Mayas. The familiarity of this species and its mournful quavering cry uttered at night have no doubt led to its association with death and mystery as with owls in other parts of the world.

This Moan bird has an important place in the Maya pantheon, as it is the representative in many places of god A, the Death god. It appears with a human body in Dresden 7c (Pl. 23, fig. 1), 10a (Pl. 23, fig. 8), and 11a (Pl. 23, fig. 3) and in Tro-Cortesianus 66a (Pl. 23, fig. 2). In each of these places, it occupies the space in which one of the regular gods is usually found. In Dresden 10a, the day reached in the *tonalamatl* reckoning is *Cimi*, meaning death, and here, as has been noted, is found the Moan bird, the symbol of death, with another sign of death in the circle just above the head of the bird (Pl. 23, fig. 8).

This owl is used as a head-dress itself, but always for women, Dresden 16a (Pl. 23, fig. 19), 18b (Pl. 23, fig. 5), Tro-Cortesianus 94c (Pl. 23, fig. 4), and 95c (Pl. 23, fig. 20). It occurs in both manuscripts in the pages mentioned several times before, where birth, baptism, and the naming of children are shown. The curious figure, with a head similar to Pl. 23, fig. 21, carried on the back of some of the women, is the Moan sign, referring to the idea of death, possibly to still-birth, as copulation and birth are shown in this section of the codex (Dresden 18c, 19c). The Moan is found associated with man only once in the manuscripts. In Tro-Cortesianus 73b

*Brinton (1895, p. 74), according to our interpretation, makes a mistake when he considers the crested falcon as the Moan, "in Maya *muan* or *muyan*." He adds, "Some writers have thought the moan bird was a mythical animal but Dr. C. H. Berendt found the name still applied to the falcon. In the form *muyan*, it is akin in sound to *muyal*, cloud, *muan*, cloudy, which may account for its adoption as a symbol of the rains, etc."

(Pl. 23, fig. 18), he is found perching on a curious frame-like structure in which god B is sitting.

There are several glyphs representing the Moan bird or screech owl; the first type is easily identifiable, as the head of the bird is clearly pictured (Pl. 23, figs. 11–14, 16). This head is frequently associated with the number thirteen (Dresden 8b). It may occur in the line of glyphs (Dresden 16c), and refer to the Moan pictured below, or it may occur in the line of glyphs with no picture corresponding to it below (Dresden 53b). Pl. 23, fig. 15, from Dresden 38c has been placed with these drawings, although the identification is not certain. It may refer, however, to the large Moan head below, on which god B is sitting (Pl. 23, fig. 11). The second type of glyph does not resemble in any way the Moan, but they are clearly signs for it, as they are often found in connection with the picture of the Moan, Dresden 7c (Pl. 23, figs. 6, 7, 21) and 10a. In both places fig. 7 is associated with the number thirteen. Schellhas also places Pl. 23, fig. 17, among the Moan signs.

One of the eighteen Maya months is named Muan, and some of the glyphs appearing for this month in the codices certainly represent the Moan or screech owl. This is especially so with text figs. 3–6. Förstemann (1904a) considers

FIGS. 3, 4, 5, 6.

GLYPHS OF MONTH MUAN SHOWING MOAN-BIRD CHARACTERISTICS.

that the month Muan and, consequently, the sign as well, refer to the Pleiades.

In connection with the screech owl referring to death, it is interesting to note that among the Nahuas the owl is considered of unlucky augury and is usually found in the "House of Death" and "of Drought", as contrasted with

the turkey, considered as a bird of good fortune, and found in the "House of Rain."

COPPERY-TAILED TROGAN or QUETZAL (*Pharomacrus mocinno*). The quetzal is common locally in certain parts of southern Mexico. Its brilliant metallic green plumage and the greatly elongated tail feathers make it a very notable bird. The feathers of the head are erect and stand out as a light crest, those of the anterior portion being slightly recurved. The delicate erect feathers of the head are well indicated in Vaticanus 3773, 17 (Pl. 24, fig. 9) and the tail, also, in this figure, is only slightly conventionalized with an upward instead of the natural downward sweep. In most of the representations, the crest feathers are indicatd by large plumes, the most anterior of which project forward. They may be even further modified into three knobs shown in Dresden 7c (Pl. 24, fig. 1). The two characteristics of the quetzal, namely its erect head feathers and its extraordinarily long tail feathers, are often used separately. Thus the tail, which is commonly drawn with the outer feather of each side strongly curled forward, appears by itself in Pl. 24, fig. 8, or it may be seen as a plume in the head-dress of a priest or warrior and in other connections as an ornament. A greatly conventionalized drawing of the bird is also shown in Pl. 24, fig. 11, in which the head bears a curious knob and the dorsal feather of the tail is upcurled in the manner of the other drawings. It is not at once apparent why the long drooping tail feathers should be shown thus recurved. Possibly these feathers, when used by the Mayas for plumes, curled over by their own weight, if held erect, so that the representations are a compromise between the natural appearance and that when used as ornament in the head decoration.

The color of the bird and the very long tail feathers have already been mentioned, and these explain the reason of the importance of this bird among the Mayas. It is claimed by several old authorities that the quetzal was reserved for the rulers, and that it was death for any common person to kill this bird for his own use. It seems from a statement in

Landa (1864, p. 190)* that birds were domesticated for the feathers. This bird occurs again and again in various modifications throughout the Maya art. The feathers of the quetzal are the ones usually associated with the serpent, making the rebus, *Quetzalcoatl*, the feathered serpent, the culture hero of the Nahuas, or *Kukulcan*, which has the same signification among the Mayas. It is impossible to mention here all the various connections in which the quetzal appears. The feathers play an important part in the composition of

FIG. 7.
QUETZAL, TEMPLE OF THE CROSS, PALENQUE.

the head-dresses of the priests and warriors, especially those in the stone carvings. A quotation has already been given from Landa, showing the use made of feathers in the dress of the people. Text fig. 7 shows perhaps the most elaborate representation of this bird. It is found on the sculptured tablet of the Temple of the Cross at Palenque. The quetzal is shown seated on top of a branching tree which was long taken to represent a cross. A similar representation is seen

*"Crian paxaros para su recreacion y para las plumas para hazer sus ropas galanas."

on the tablet of the Temple of the Foliated Cross from the same ruined city. In the Codex Fejervary-Mayer, there are four trees in each of which there is a bird. A quetzal is perched in the one corresponding to the east, which is regarded as the region of opulence and moisture. Seler (1901, p. 17) suggests that the quetzal in the tree on the two bas-reliefs at Palenque may represent a similar idea and that temples which would show the other three trees and their respective birds had not been built in that center.

The representation of the quetzal as an entire bird is, after all, comparatively rare. The most realistic drawing is seen on a jar from Copan in the collections of the Peabody Museum. The whole body of the bird is shown as a head-dress in a few places in the codices where birth and the naming of children are pictured. In Dresden 16c (Pl. 24, fig. 3) and Tro-Cortesianus 94c (Pl. 24, fig. 6), the quetzal is the head-dress of women. In Dresden 13b (Pl. 24, fig. 2), a partial drawing of the bird is shown as a part of the head-dress of god E, in Dresden 7c (Pl. 24, fig. 1) of god H, and in Tro-Cortesianus 110c of god F. The feathers alone appear as a female head decoration in Dresden 20c (Pl. 24, fig. 8). It occurs as a sacrifice among the rites of the four years in Tro-Cortesianus 36b (Pl. 24, fig. 12). In Tro-Cortesianus 70a (Pl. 24, fig. 5), it is found in the act of eating fruit growing over the "young god." In Tro-Cortesianus 100b (Pl. 24, fig. 4), the bird is perched over the encased head of god C.

There seems to be a glyph used for the quetzal. In those drawn in Pl. 24, figs. 10, 17, it is noticeable that the anterior part only of the head is shown. The first is a glyph from the tablet of the Temple of the Sun at Palenque, and at least suggests the quetzal by the feathers on the top of the head, as also Pl. 24, fig. 13, a glyph from Copan, Stela 10, where the entire head appears in a much conventionalized form. Other glyphs are shown in Pl. 24, figs. 14–16, in which there is a single prominent recurved feather shown over the eye, succeeded by a few conventionalized feathers, then one or more directed posteriorly. It is to be noted that whereas in many

previous examples of glyphs the full drawing of the animal or bird has been found in connection with them, here with the quetzal glyphs there is no instance where a drawing of the bird occurs with them. A curious human figure (Pl. 24, fig. 19), with a head decoration similar to the frontal curve and markings on the quetzal glyphs (fig. 14–16), may possibly represent this bird in some relation.

BLUE MACAW (*Ara militaris*). A large macaw (Maya, *mox* or *tut*) is undoubtedly pictured in the figures in Pl. 25. The least conventionalized drawing found is that shown in Dresden 16c (Pl. 25, fig. 2), a bird characterized by long narrow tail feathers, a heavy bill, and a series of scale-like markings on the face and about the eye. Further conventionalized drawings are found in Pl. 25, figs. 3, 10, 13, and Pl. 26, fig. 1. In all these the tail is less characteristic, though composed of long, narrow feathers, and the facial markings are reduced to a ring of circular marks about the eye. These last undoubtedly represent, as supposed by Stempell, the bare space about the eye found in certain of these large parrots. In addition, the space between the eye and the base of the bill is partially bare with small patches of feathers scattered at somewhat regular intervals in rows. It is probable that this appearance is represented by the additional round marks about the base of the bill in Pl. 25, figs. 1, 2, 5, 8, the last two of which show the head only. There has hitherto been some question as to the identity of certain stone carvings, similar to that on Stela B from Copan, of which a portion is shown in Pl. 25, fig. 8. This has even been interpreted as the trunk of an elephant or a mastodon, but is unquestionably a macaw's beak. In addition to the ornamental crosshatching on the beak, which is also seen on the glyph from the same stela (Pl. 25, fig. 5), there is an ornamental scroll beneath the eye which likewise is crosshatched and surrounded by a ring of subcircular marks that continue to the base of the beak. The nostril is the large oval marking directly in front of the eye.

The animal in Dresden 40b (Pl. 25, fig. 1) has always

been considered to be a tortoise (Schellhas, 1904, p. 44, and Förstemann, 1904). This animal, together with the dog, is found beneath the constellation signs carrying firebrands; both are regarded as lightning beasts. By comparing the head of the figure shown in Pl. 25, fig. 1, with figs. 2, 4, 5, of the same plate, the reasonableness of the identification of this head as that of a macaw and not that of a tortoise appears clear. The same figure occurs in Tro-Cortesianus 12a (Pl. 25, fig. 3) carrying a torch.

In order to make this point clearer, we will take up the consideration of the glyphs at this place, rather than at the end of the section as usual. As the macaw in Pl. 25, fig. 1, has been hitherto identified as a turtle, so the glyph found in connection with it (Pl. 25, fig. 6) has been considered to stand for the turtle. Pl. 25, fig. 7, is another drawing of the same glyph. By comparing the markings on the face of fig. 1, it is seen that a similar ring surrounds the eye shown on the glyph. The second glyph (Pl. 25, fig. 7) is better drawn and shows, in addition to the eye ring, the slightly erectile feathers at the back of the head. Comparison with the glyphs representing turtles (Pl. 14, figs. 7–10) hitherto confused with these macaw glyphs shows differences, the most important of which are of course the eye ring and the feathers at the back of the head.

Various other glyphs occur which undoubtedly represent the heads either of macaws or smaller parrots. They are, for the most part, glyphs from the stone inscriptions. A crest, resembling that depicted on the head of the quetzal, is found on a glyph on Altar Q from Copan (Pl. 25, fig. 10). The eye ring, however, seems to indicate the macaw which also has slightly erectile feathers on the head. Much doubt is attached to the identification of the glyph of the month *Kayae* from Stela A, Quirigua (Pl. 25, fig. 9). It resembles closely the glyphs of the turtle (Pl. 14, figs. 7–9) and especially that on Pl. 14, fig. 10. The Quirigua glyph has a prominent fleshy tongue, however, like the parrot. From the fact that the glyph is certainly that for the month *Kayab* and the

Kayab glyphs in the codices (Pl. 14, fig. 10) resemble the sign for *a*, in the Landa alphabet which seems to stand for *ak* (turtle), we are led to identify this as a turtle rather than a parrot.

The use of the macaw as a lightning beast has already been commented upon. The parrot is also used in the codices as a head-dress. As with several other birds the only places in the manuscripts where the whole bird is shown is in connection with the bearing of children and the baptism. Here the parrot head-dress is seen on women, Dresden 16c (Pl. 25, fig. 2) and Tro-Cortesianus 94c (Pl. 25, fig. 13). There seems to be an exception to the whole bird appearing as a head-dress exclusively with women in Tro-Cortesianus 26c (Pl. 26, fig. 1), where god F appears with a head-dress composed of the whole bird. The bird is also seen as a head-dress on Altar Q from Copan (Pl. 26, fig. 3). The head of the macaw appears as part of the head-dress of god H in Dresden 11a (Pl. 26, fig. 13), god E in Dresden 11b (Pl. 26, fig. 11), god F in Dresden 14b, god D in Tro-Cortesianus 89a (Pl. 26, fig. 5) and of women in Dresden 12b (Pl. 26, fig. 6) and 19a (Pl. 26, fig. 9). In the rites of the four years in Tro-Cortesianus 37b, there are two birds which are quite different from those we have been considering, but which may represent macaws (Pl. 25, fig. 12; Pl. 26, fig. 10).

In the Nuttall Codex, occur several figures of heavy-billed birds that may be macaws or other smaller parrots of the genera *Amazona* or *Pachyrhynchus*. They are not, however, certainly identifiable (Pl. 26, figs. 4, 7).

Imperial Woodpecker (*Campephilus imperialis*). We have here introduced two drawings from the Nuttall Codex (Pl. 27, figs. 5, 6) which seem to represent the Imperial ivory-billed woodpecker, a large species that occurs in the forests of certain parts of Mexico. The figures show a long-billed bird with acutely pointed tail feathers, a red crest, and otherwise black and white plumage. The red crest of the woodpecker is of course highly conventionalized in the drawings where it is shown as of a number of erect feathers

instead of the prominent occipital tuft of this bird. The crest and particularly the pointed tail feathers and long beak combined with the characteristic coloring seem to leave little doubt as to the identity of the species figured. This bird does not seem to appear in the Maya drawings.

RAVEN (*Corvus corax sinuatus*) (?). There occurs in the Nuttall Codex a figure of a large black bird (Pl. 27, fig. 7), which may be a black vulture, but which, from the presence of what appear as prominent bristles over the nostril, may also be a raven. These bristles are rather prominent in ravens and quite lacking in the vulture, so that we are led to identify the drawing as representing the former bird. We have found no other figures that suggest ravens.

MISCELLANEOUS BIRDS. Four drawings of birds from the Aubin manuscript are shown here (Pl. 27, figs. 8–11), in order that the conventionalization of the bird form may be seen. The first two are supposed to represent the parrot (*cocho*) and the last two the turkey cock (*uexolotl*). There is little in the drawings by which they can be differentiated. In the codex, the heads of the parrots are colored red. There is no doubt, however, about the identification, as they occur in the same relative position on every page of the manuscript and are two of the thirteen birds associated with the thirteen gods, the "Lords of the House of Day" (Seler, 1900–1901, pp. 31–35). From the foregoing, it may be seen that where there is no question about the identification, the drawing of the bird form is rather carelessly done and no great attempt is made to indicate the special characteristics of the different birds.

As has been shown previously, it is not always possible to identify without question many of the forms appearing in the manuscripts. This is especially true with birds. In Tro-Cortesianus 20c, an unidentifiable bird, painted blue, appears on the top of the staff carried by god F. The headdress of this same god in Tro-Cortesianus 27c is a bird form and in Tro-Cortesianus 55b, the *tonalamatl* figure is a bird whose identity cannot be made out with certainty.

MAMMALIA

OPOSSUM (*Didelphis yucatanensis, D. mesamericana*). Figures representing opossums are not with certainty identifiable in the Maya writings. We have provisionally identified as a frog the animal shown in Pl. 29, fig. 6, although at first sight the two median round markings might be taken to represent a marsupial pouch. Stempell considers the animals found in the upper division of Dresden 25–28 as opossums of one of the above species, and this seems very possible. They are shown with long tails, slightly curved at the tips, and with long head and prominent vibrissae. A rather similar figure is found in the Nuttall Codex (Pl. 34, fig. 7). There is nothing, however, that seems to preclude their being dogs and, in our opinion, they represent this animal.

NINE-BANDED ARMADILLO (*Tatu novemcinctum*). This is the common species of armadillo (Maya, *wetš*) found throughout the warmer portion of Mexico and Central America, where it is frequently used as an article of food, and its shell-like covering is utilized in various ways. Several representations of it occur in the Tro-Cortesianus (Pl. 29, figs. 1–4), where it is characterized by its scaly covering, long ears and tail, and the moveable bands about the body.

This animal is associated with the bee culture, as it is represented twice in Tro-Cortesianus 103a (Pl. 29, figs. 1, 3) seated below a bee under an overhanging roof. The hunting scenes in the Tro-Cortesianus also show the armadillo; in 48a (Pl. 29, fig. 4) and in 91a it is shown in a pit-fall. In the last case the *Cauac* signs are clearly seen on top of the trap, whereas in the former case the same signs seem to be indicated by the crosses. Finally, this same animal occurs seated in Tro-Cortesianus 92d (Pl. 29, fig. 2) facing a female figure. There seems to be no glyph used in connection with this animal.

YUCATAN BROCKET (*Mazama pandora*). Among the numerous representations of deer in the Maya writings, there

is but one that appears to show the brocket. This occurs in Tro-Cortesianus 92a (Pl. 30, fig. 2), where a hoofed animal with a single spike-like horn is shown, seemingly impaled on a stake set in the bottom of a pit-fall. As stated by Stempell, this animal from the character of its horns is probably to be identified as a brocket, though there is nothing to preclude its being a young spike buck of some species of *Odocoileus*.

YUCATAN DEER (*Odocoileus yucatanensis; O. thomasi*). Several species of small deer (Maya, *ke*) occur in Mexico and Central America whose relationships are not yet thoroughly understood (Pls. 30–32). The species of Yucatan and southern Mexico have small lyrate antlers with few, short tines, rather different from the broader type of the more northern species with well developed secondary tines. The former type of antlers seems to be indicated by the conventionalized structure shown in Pl. 32, figs. 8–12. These probably represent the Yucatan deer or its ally Thomas's deer of southern Mexico. Two of the figures, both from the Nuttall Codex, show the lower incisor teeth (Pl. 32, figs. 8, 11), though in other cases these are omitted. The larger part of the figures of deer represent the does which have no antlers. For this reason it is impossible to distinguish females of the brocket from those of the other species of deer, if indeed, the Mayas themselves made such a distinction. The characteristics of deer drawings are the long head and ears, the prominently elevated tail with the hair bristling from its posterior side (the characteristic position of the tail when the deer is running), the hoofs, and less often the presence of incisors in the lower jaw only and of a curious oblong mark at each end of the eye, possibly representing the large tear gland.

The deer plays a large part in the Maya ceremonials. It is an important, perhaps the most important animal offering as a sacrifice to the gods. Several pages of the Tro-Cortesianus (38–49) are given over to the hunt and the animal usually represented is the deer, the hunters are shown, the methods of trapping, the return from the chase, and the rites in connection with the animals slain. Tro-Cortesianus

48b (Pl. 30, fig. 1) shows the usual method of trapping where the deer is caught by a cord around one of the fore legs. Tro-Cortesianus 91a pictures the same method and 92a (Pl. 30, figs. 2) shows where the deer is caught on a spike in another type of trap. In Tro-Cortesianus 86a (Pl. 31, fig. 5) the deer appears with a rope around his body held by a god who is not easily identified.

Interesting descriptions of the hunt are given in several of the early accounts.* It will be noted that the hunt was usually connected with the religious rites and the offering of deer meat and various parts of the body of the deer had a ceremonial importance. Attention is called to similar

*_Relacion hecha por el Licenciado Palacio al Rey. D. Felipe II_ (1866, p. 31). "Lo que hacian en los sacrificios de la pesca y caza, era que tomaban un venado vivo y llevábanlo al patio del cu é iglesia que tenian fuera del pueblo y allí lo ahogaban y lo desollaban y le salaban toda la sangre en una olla, y el hígado y bofes y buches los hacian pedazos muy pequeños y apartaban el corazon, cabeza y pies, y mandaban cocer el venado por si, la sangre for sí, y mientras esto se cocia, hacian su baile. Tomaban el Papa y sábio la cabeza del venado por las orejas, y los cuatro sacerdotes los cuatro pies, y el mayordomo llevaba un brasero, do se quemaba el corazon con ulí y copa, é incensaban al ídolo que tenian puesto y señalado para la caza y pesca. Acabado el mitote, ofrecian la cabeza y piés al ídolo y chamuscábanla, y despues de chamuscada, la llevaban á casa del Papa y se la comia y el venado y su sangre comian los demás sacerdotes delante del ídolo; á los pescados les sacaban las tripas y los quemaban ante el dicho ídolo. Lo propio era con los demás animales."

Relacion de Cotuta y Tibolon (1898, p. 105). "Un dios que dezian que eran benados en matando un yndio un benado benia luego a su dios y con el coraçon le untaba la cara de sangre y sino mataba algo aquel dia ybase a su casa aquel yndio le quebraba y dabale de cozes diziendo que no era buen dios."

Cogolludo (1688, Book I, Chap. VII, p. 43) "Correan tan poco los venados, y tan sin espantarse de la gente, que los soldados de á cavallo del exercito los alcancavan, y alançeavan, muy á su placer, y de esta suerte mataron muchos de ellos, con que comieron algunos dias despues . . . Que en que consistia aquella novedad, de aver tanta maquina de venados, y estar tan mansos? Les dieron por respuesta; Que en aquellos Pueblos los tenian por sus Dioses á los venador; porque su Idolo Mayor se les avia aparecido en aquella figura."

practices among the Lacandones, the inhabitants of the region of the Usumacinta at the present time (Tozzer, 1907), where the greater part of the food of the people must, first of all, be offered to the gods before it may be eaten by the natives.

The figures of the deer in the codices are clearly associated with god M, and the latter may be considered a god of the hunt as well as a god of war. It is very unusual to find a quadruped used as a head-dress in any way, and yet in several cases we find god M has the head of a deer as a sort of head covering, Tro-Cortesianus 50b (Pl. 31, fig. 6), 51c (Pl. 31, fig. 7) and 68b. In the first two cases, the god seems to be supplied with a bow and arrow. In a passage in Landa (1864, p. 290)* there is a description of this very scene.

In the month *Zip*, the hunters each took an arrow and a deer's head which was painted blue; thus adorned they danced. God M is found in one case in the Dresden in connection with the deer. In Dresden 13c the animal is represented as female and is shown in intercourse with god M.

An offering of venison is frequently pictured in the manuscripts. Landa (1864, p. 220)† also furnishes a parallel for this. The haunches of venison arranged as offerings in dishes are realistically seen in a number of representations of religious rites, as in Dresden 28c (Pl. 31, fig. 14) in the last of the rites of the dominical days, 35a (Pl. 31, fig. 12) and in Tro-Cortesianus 5a above the serpent enclosing the body of water, 65a in front of god B or D and 105b (Pl. 31, fig. 13) and 108a (Pl. 31, fig. 15), both of which are in connection with the bee ceremonies.

The head of the deer, rather than the legs, is also shown.

*"Y con su devocion invocavan los caçadores a los dioses de la caça, . . . sacava cada uno una flecha y una calabera de venado, las quales los *chaces* untavan con el betun azul; y untados, vailavan con ellas en las manos unos."

†In the *Muluc* years, he states "davan al sacredote una pierna de venado" and also in the same month, "Ofrecian a la imagen pan hecho como yemas de uevos y otros como coraçones de venados, y otro hecho con su pimienta desleida."

as an offering, in Tro-Cortesianus 69b with god B and Tro-Cortesianus 78 (Pl. 31, fig. 10) in the line of glyphs. The whole deer may be represented as an offering in Tro-Cortesianus 2b (Pl. 31, fig. 8).*

There are some examples in the manuscripts where the deer is pictured quite apart from any idea of the hunt or an offering. In Tro-Cortesianus 14b, it is shown on top of the body of one of the large snakes and in Tro-Cortesianus 29c (Pl. 31, fig. 3), it appears seated on the end of a snake-like curve. The deer occurs in Tro-Cortesianus 30b (Pl. 30, fig. 6) in connection with the goddess from whose breasts water is flowing. God B appears in Dresden 41c (Pl. 31, fig. 1) seated on a red deer. The same animal is also to be noted in Dresden 60a (Pl. 30, fig. 5) in connection with the combat of the planets.† A deer is seen in Tro-Cortesianus 92d seated on a mat opposite a female figure in the same manner as the armadillo on the same page and a dog on the preceding page. These, as previously noted, probably refer to cohabitation. On Pl. 32, fig. 9, is a deer from the Peresianus and Pl. 32, fig. 12, shows another from Stela N, east, from Copan.

The Nahua day *Maçatl* signifies deer and we naturally find a large number of glyphs representing this animal among the day signs in the Mexican manuscripts (Pl. 31, fig. 9; Pl. 32, figs. 8, 10, 11).

YUCATAN PECCARY (*Tayassu angulatum yucatanense; T. ringens*). Peccaries (Maya, *qeqem*) of the *T. angulatum* group are common in Mexico and Yucatan, and a number of local forms have been named. The white-lipped peccaries also occur, but in the figures it is impossible to distinguish the species. These animals are characterized by their prominent snout, curly tail, bristling dorsal crest, and rather formidable tusks, as well as by the possession of hoofs. By these marks most of the figures are readily identifiable (Pl. 32, fig. 1; Pl.

*Förstemann (1902, p. 20) identifies this animal as a rabbit!

†Förstemann identifies this animal as a dog.

33, figs. 1, 2, 4–6, 9). The tail is, however, often omitted as well as the erect line of bristles down the back. The presence of hoofs and the possession of a truncated pig-like snout are sufficiently characteristic. In the Dresden Codex occur several figures of undoubted peccaries. Two of these are pictured in Pl. 32, figs. 2, 4. In each the hoofs and curly tail appear, and in the latter figure the bristling back is conventionally drawn by a series of serrations. These marks are sufficient to identify the animals. Their heads are further conventionalized, however, by a great exaggeration of the snout beyond that slightly indicated in Pl. 32, fig. 1, and Pl. 33, figs. 6, 9. Other representations of the peccary, are shown in Pl. 32, fig. 5, a man with a peccary's head, and fig. 7 in which the animal's hoofs are replaced by human hands and feet. In both cases the form of the head remains characteristic. A curious combination is shown in Pl. 32, fig. 3, an animal whose head and fore feet are those of a peccary, while the hind feet have five toes, and there is a long tail. The addition of what look like scales is found in a figure from the Dresden (Pl. 32, fig. 6).

The peccary is found in several different connections in the manuscripts. As deer are found associated with the hunt, so, but to a much more limited extent, the peccary. It is represented pictured as being captured in snares of the familiar "jerk-up" type. Similar drawings show this animal caught by the foreleg and held partially suspended, Tro-Cortesianus 49a (Pl. 33, fig. 9),* 49c (Pl. 33, fig. 1), and 93a (Pl. 33, fig. 4). Tro-Cortesianus 41b also shows the peccary associated with hunting scenes. Another realistic drawing of this animal in Dresden 62 (Pl. 33, fig. 6)† represents him as seated on the open jaws of a serpent connected with a long number series. We are unable to explain the signification of the appearance of the animal in this connection. The peccary

*This animal has been identified by Stempell as an agouti notwithstanding the hoofs and tusks.

†Förstemann (1906, p. 228) suggests that this animal is a bear.

is pictured in Tro-Cortesianus 27b (Pl. 33, fig. 5) seated on the left hand of the goddess from whose breasts water is flowing.

The peccary seems to be associated with the sky, as it is seen in a conventionalized form in four instances (Dresden 44b, 45b, (Pl. 32, fig. 4) coming from a band of constellation signs and in Dresden 68a (Pl. 32, fig. 2) coming from a similar band with god E sitting underneath.* Above each of these conventionalized figures occur the corresponding glyph forms (Pl. 33, figs. 7, 8), which show merely the head with the exaggerated upturned snout. There is a striking resemblance between these snouts and those of the stone mask-like figures so frequently represented as a façade decoration in northern Yucatan. The presence in the mouths of the faces there represented of a recurved tusk in addition to other teeth is a further resemblance to the drawings of peccaries. Stempell (1908, p. 718) has reproduced a photograph of these extraordinary carvings and considers them the heads of mastodons, apparently solely on account of the shape of the upturned snout, whose tip in many of the carvings turns forward. They certainly do not represent the heads of mastodons, but we are not ready to say that the peccary is the prototype of these carvings, although the similarity between the glyphs (Pl. 33, figs. 7, 8) and the masks is worthy of note. One point which does not favor this explanation is the fact that on the eastern façade of the Monjas at Chichen Itza where the mask-like panel is seen at its best, we find a realistic drawing of a peccary (Pl. 33, fig. 2) on the band of glyphs over the doorway, and it in no way suggests the head on the panel and is quite different from the head already noted as the glyph of the peccary in the codices.

BAIRD'S TAPIR (*Tapirella bairdi*). No undoubted representations of tapirs occur in the manuscripts here considered.

*Attention is called to the curious half-human, half-animal figure in Tro-Cortesianus 2a which may suggest the figures in Dresden 44a, 45a and which are here identified as peccaries. Both are descending from the band of constellation signs and the heads of each are not greatly dissimilar.

Possibly tapirs did not live in the country occupied by the Maya peoples. At the present time they are found only to the south of Yucatan. In Central America Baird's and Dow's tapirs are native, the latter, however, more on the Pacific coast. We have included a drawing of an earthenware vessel (Pl. 28, fig. 1) that represents a tapir, about whose neck is a string of Oliva shells. The short prehensile trunk of the tapir is well made and the hoofs are likewise shown. A greatly elongated nose is found in many of the drawings of the deities, but it does not seem clear that these represent trunks of tapirs, or, as suggested by Stempell, mastodons! Two such heads are shown in Pl. 39, figs. 7, 9. These offer a considerable superficial resemblance to that of a tapir, but as no other drawings that might be considered to represent this animal are found, it seems very questionable if the long noses are other than parts of grotesque masks. The superficial resemblance of the curious nose pieces of the masks on the panel of the Maya façades to elephants' trunks does not seem to us especially significant, as otherwise the carvings are quite unlike elephants. They have no great tusks as an elephant should, but, instead, short recurved teeth similar to those representing peccary tusks, as already pointed out.

RABBIT (*Sylvilagus* or *Lepus*). Rabbits and hares from their familiarity, their long ears, and their peculiar method of locomotion, seem always to attract the notice of primitive peoples. Several species occur in Mexico, including the Marsh rabbit (*Sylvilagus truei; S. insonus*), various races of the Cottontail rabbit (*S. floridanus connectens; S. f. chiapensis, S. f. yucatanicus; S. aztecus; S. orizabae,* etc.) and several Jack rabbits (*Lepus alleni pallitans; L. callotis flavigularis, L. asellus*). It is, of course, quite impossible to determine to which of these species belong the few representations found. Several drawings, shown in Pl. 30, figs. 3, 4, 7, 8, are at once identifiable as rabbits from their long ears, round heads, and the presence of the prominent gnawing teeth.*

*Forstemann (1906, p. 229) suggests that fig. 8 is a walrus!

In two of the figures (Pl. 30, figs. 7, 8), the entire animal is shown, sitting erect on its haunches, the first with one ear in advance of the other, a trait more characteristic of the jack rabbit than of the short-eared rabbits. For convenience of comparison, we have placed beside these two figures one of a deer in much the same position. It is at once distinguished, however, by its long head, longer bushy tail, and by the marks at each end of the eye. What at first sight appear to be two gnawing teeth of the rabbit seem to be the incisors of the lower jaw. This is the animal identified by Stempell as a dog.

The animal shown to be a rabbit in Dresden 61 (Pl. 30, fig. 8) is pictured seated on the open jaws of a serpent in the same way as the peccary on the following page. These two animals, together with two representations of god B and the black god (Dresden 61), are each clearly connected with the serpents on which they are sitting.

The Nahua day *Tochtli* signifies rabbit and naturally the animal occurs throughout the Mexican manuscripts as representing this day (Pl. 30, figs. 3, 4).

OTHER RODENTS. We have included in Pl. 29, figs. 5, 7, 8, three undetermined mammals. The second of these is characterized by the two prominent gnawing teeth of a rodent and by its long tail. It may represent a pack rat (*Neotoma*) of which many species are described from Mexico. In its rounded ears and long tail, fig. 5 somewhat resembles fig. 7, but it lacks the gnawing incisors. Still less satisfactory is fig. 8 from Tro-Cortesianus 24d, at whose identity it seems unsafe to hazard a guess. It is shown as eating the corn being sowed by god D.

JAGUAR (*Felis hernandezi; F. h. goldmani*). Throughout its range, the jaguar (Maya, *balam* or *tšakmul*) is the most dreaded of the carnivorous mammals. It is, therefore, natural that the Mayas held it in great awe and used it as a symbol of strength and courage. A few characteristic figures are shown in Pl. 34, figs. 1–3; Pl. 35, figs. 5–14. The species represented is probably *Felis hernandezi*, the Mexican

race of jaguar, or one or the other of the more or less nominal varieties named from Central America. The distinguishing mark of the jaguar, in addition to the general form with the long tail, short ears and claws, is the presence of the rosette-like spots. These are variously conventionalized as solid black markings, as small circles, or as a central spot ringed by a circle of dots (Pl. 35, fig. 12). Frequently the solid black spots are used, either in a line down the back and tail or scattered over the body. The tip of the tail is characteristically black, and the teeth are often prominent. Such a figure as this (Pl. 35, fig. 10) Stempell considers to be a water opossum (*Chironectes*), for the reason that it is held by the goddess from whose breast water is flowing. This can hardly be, however, for not only are the markings unlike those of the water opossum, but the large canine tooth indicates a large carnivore. Moreover, the water opossum is a small animal, hardly as big as a rat, of shy and retiring habits, and so is unlikely to figure in the drawings of the Mayas.

As for the significance of the jaguar in the life of the Mayas, it may be said that this animal seems to have played a most prominent part. At Chichen Itza, the building on top of the southern end of the eastern wall of the Ball Court, usually called the Temple of the Tigers, has a line of jaguars carved in stone as frieze around the outside of the building, and in the Lower Chamber of the same structure, the figure of a jaguar (Maudslay, III, Pl. 43) serves as an altar. The front legs and the head of a jaguar often are seen as the support of a seat or altar on which a god is represented as at Palenque in the Palace, House E (Maudslay, IV, Pl. 44) and in the Temple of the Beau Relief (Holmes, 1895–1897, Pl. 20). Altar F at Copan (Pl. 35, fig. 7) shows the same idea. The head of a puma or jaguar (Pl. 34, fig. 6) appears in the bas-relief of the Lower Chamber of the Temple of the Tigers, evidently representing a part of an altar. A realistic carving of a jaguar was found on a stone near the Temple of the Cones at Chichen Itza (Maudslay, III, Pl. 52, fig. a), and another occurs near the present hacienda of Chichen Itza carved in relief on a ledge of rock.

In the Maya manuscripts the jaguar appears in a number of connections. Its mythological character is shown in Dresden 8a (Pl. 35, fig. 5), where it is pictured as the *tonalamatl* figure. The day reached here in the reckoning is *Ix*, and this corresponds to the Nahua *Oceolotl*, which means jaguar. In Dresden 26, in the pages showing the ceremonies of the years, the jaguar is carried on the back of the priest, evidently representing one of the year bearers (*Ti cuch haab*). Balam, the name of the jaguar, is the title given to the four *Bacabs* or *Chacs*, the gods of the four cardinal points. In Tro-Cortesianus 64a, two jaguar heads are noted as the end of curious bands of *Caban* signs over a flaming pot. The second one is shown as dead. A jaguar head is employed in two places in the Tro-Cortesianus, 34a and 36a, as a headdress for a god who is in the act of sowing corn. This animal appears very infrequently in the pages of the Tro-Cortesianus given over to the hunting scenes, 41c, 40c, 43b, and, even here, it never appears in the same way as the deer and peccary, as an animal for sacrifice.

The jaguar as a predacious beast is noted in Tro-Cortesianus 28b (Pl. 35, fig. 8), where it is attacking god F in a similar way as the vultures in the preceding picture. The jaguar appears in Tro-Cortesianus 30b (Pl. 35, fig. 10) seated on the right hand of the goddess from whose breasts water is flowing. The figure in Tro-Cortesianus 12b between the various offerings may be a jaguar or a dog, more probably from its connection with an offering, the dog. A curious modification of the jaguar may be shown in Tro-Cortesianus 20a (Pl. 34, fig. 2), where a god is seated on the gaping jaws of some animal whose identity is uncertain. It may be a serpent, although the black-tipped tail from which the head appears to come certainly suggests the jaguar.

There are several carved glyphs in stone that probably represent jaguars. Two of these (Pl. 28, fig. 4; Pl. 35, fig. 9) have the characteristic round spots, but others are unmarked, and suggest the jaguar by their general character only (Pl. 35, fig. 6). This latter may, of course, represent the puma quite

as well. A realistic jaguar head appears as a glyph in Tro-Cortesianus 2a (Pl. 35, fig. 13). The more usual glyph for the jaguar is more highly conventionalized, although the spots and the short rounded ear are still characteristic (Pl. 35, fig. 11). A slight modification of this glyph appears in Dresden 8a in connection with the full drawing of the animal below.

The Nahua day *Oceolotl*, as already noted, means jaguar, and the jaguar glyph is found among the day signs (Pl. 34, fig. 3). Seler (1904, p. 379) associates the jaguar in the Vaticanus and the Bologna with *Tezcatlipoca*. He notes that the second age of the world, in which the giants lived and in which *Tezcatlipoca* shone as the sun, is called the "jaguar sun." *Tezcatlipoca* is supposed to have changed himself into a jaguar.

PUMA (*Felis bangsi costaricensis*). As shown by Stempell, there can be little doubt that some one of the mainly nominal species of Central American puma is represented in Dresden 47 (Pl. 34, fig. 7). This animal is colored reddish in the original, as is the puma, is without spots, although the tip of the tail, as in the pictures of the jaguar, is black. The animal is represented as being transfixed with a spear.* Another animal colored red in Dresden 41c seems to represent a puma. God B is shown seated upon him. A crude figure from the Painted Chamber of the Temple of the Tigers (Pl. 34, fig. 5) is probably the same species of puma. The cleverly executed head, shown in profile in Pl. 34, fig. 6, is also perhaps the same animal, although it may possibly represent the jaguar. One or the other of these two cats is also intended, in Pl. 34, fig. 4, a drawing of a piece of pottery.

COYOTE (*Canis*). Two figures from the Nuttall Codex have been included as possibly representing coyotes (Pl. 35, figs. 1, 2). They are chiefly characterized by their prominent ears and bristling hair, and seem to be engaged in active combat. Coyotes of several species occur in Mexico and though

*Seler (1904) gives an interesting explanation of the reason why the puma and the other corresponding figures are shown hit with a spear.

not generally regarded as aggressive animals are of a predacious nature. No drawings of the coyote have been noted in the Maya codices.

Dog (*Canis*). The dog (Maya, *peq*) evidently played an important part in the life of the Mayas as it does with other races of men generally. On Pls. 36, 37, we have included certain figures of dogs from several manuscripts. These may represent two breeds, for it is well known that both a hairy and a hairless variety were found by the early discoverers in Mexico.* Hairiness is more or less clearly indicated in the following figures:—Pl. 36, figs. 1–7, 12; Pl. 37, figs. 4, 5. The figures of dogs usually agree in having a black mark about the eyes that frequently is produced as a downward curved tongue from the posterior canthus. Sometimes, as in Pl. 37, figs. 1–3, 10, this tongue is not blackened. Commonly also black patches are elsewhere distributed on the body, generally on the back. These markings are probably the patches of color separated by white areas that occur frequently in dogs or other animals after long domestication.† We have included among the figures of dogs two in which the eye is differently represented and which are unspotted (Pl. 37, figs. 4, 6). These modifications may have some special significance, but otherwise the animals appear most closely to represent dogs.

We have already suggested that the animal attired in man's clothing, and walking erect in Dresden 25a–28a is likewise a dog, though Stempell believes it to represent the opossum in support of which he calls attention to its prominent vibrissae and slightly curled tail.

**Relacion de la Ciudad de Merida* (1898, p. 63): "Ay perros naturales dela tierra que no tienen pelo ninguno, y no ladran, que tienen los dientes ralos e agudos, las orejas pequeñas, tiesas y levantadas—a estos engordan los yndios para comer y los tienen por gran rregalo—estos se juntan con los perros de españa y enjendran y los mestizos que dellos proceden ladran y tienen pelo y tambien los comen los yndios cano alos demas, y tambien los yndios tienen otra suerte de perros que tienen pelo pero tan poco ladran y son del mesmo tamaño que los demas."

†Brinton (1895, p. 72) regards these spots as representing stars.

The dog played a large part in the religion both of the Mayas and the Mexican peoples. It was connected especially with the idea of death and destruction. The Lacandones of the present time make a small figure of a dog to place on the grave (Tozzer, 1907, p. 47). This is but one of the many survivals of the ancient pre-Columbian religion found among this people. The dog was regarded as the messenger to prepare the way to the other world. Seler (1900–1901, pp. 82–83) gives an interesting parallel of the Nahua idea of the dog and his connection with death. He paraphrases Sahagun as follows: "The native Mexican dogs barked, wagged their tails, in a word, behaved in all respects like our own dogs, were kept by the Mexicans not only as house companions, but above all, for the shambles, and also in Yucatan and on the coast land for sacrifice. The importance that the dog had acquired in the funeral rites may perhaps have originated in the fact that, as the departed of both sexes were accompanied by their effects, the prince by the women and slaves in his service, so the dog was assigned to the grave as his master's associate, friend, and guard, and that the persistence of this custom in course of time created the belief that the dog stood in some special relation to the kingdom of the dead. It may also be that, simply because it was the practice to burn the dead, the dog was looked on as the Fire God's animal and the emblem of fire, the natives got accustomed to speak of him as the messenger to prepare the way in the kingdom of the dead, and thus eventually to regard him as such. At the time when the Spaniards made their acquaintance, it was the constant practice of the Mexicans to commit to the grave with the dead a dog who had to be of a red-yellow color, and had a string of unspun cotton round his neck, and was first killed by the thrust of a dart in his throat. The Mexicans believed that four years after death, when the soul had already passed through many dangers on its way to the underworld, it came at last to the bank of a great river, the Chicunauhapan, which encircled the underworld proper. The souls could get across this river only when they were

awaited by their little dog, who, recognizing his master on the opposite side, rushed into the water to bring him over." (Sahagun, 3 Appendix, Chap. I.)

As might be expected from the foregoing, there are abundant evidences in the manuscripts of the presence of the dog in the various religious rites and especially those which have to do with the other world, the Kingdom of the Dead. In Tro-Cortesianus 35b, 36b, 37a, 37b, the pages showing the rites of the four years, the dog appears in various attitudes. In 35b and 36b, it bears on his back the *Imix* and *Kan* signs, in 37a (Pl. 37, fig. 8) it is shown as beating a drum and singing, in 37b (Pl. 36, fig. 2) it is beside a bowl containing *Kan* signs. In all of these places, the dogs seem to be represented among the various birds and animals which are to be sacrificed for the new years. Landa (1864, p. 216)* states that in the *Kan* year a dog was sacrificed. In the *Muluc* year, Landa (1864, p. 222)† records that they offered dogs made of clay with bread upon their backs and a *perrito* which had black shoulders and was a virgin. It has already been noted that two of the dogs represented in Tro-Cortesianus 35b and 36b have a *Kan* and *Imix* sign fastened to the back. Moreover, we have also pointed out that the *Kan* sign frequently seems to have the meaning of maize or bread. It will be noted that in Tro-Cortesianus 36b two human feet are shown on each of which is a dog-like animal.‡ These may indicate the dance in which dogs were carried as noted by Landa. Cogolludo (1688, p. 184)§ also mentions a similar

*"Y que le sacrificassen un perro o un hombre. . . porque hazian en el patio del templo un gran monton de piedras y ponian al hombre o perro que avian de sacrificiar en alguna cosa mas alta que el."

†"Avian de ofrescerle perros hechos de barro con pan en las espaldas, y avian de vailar con ellos en las manos las viejas y sacrificarle un perrito que tuviesse las espaldas negras y fuesse virgen."

‡These might quite as well be rabbits as dogs.

§"De los Indios de Cozumèl dize, que aun en su tiempo eran grandes Idolatras, y usaban un bayle de su gentilidad, en el qual flechaban un perro q̃ auian de sacrificar."

dance. Still another reference in Landa (1864, p. 260)* mentions that in the months *Muan* and *Pax* dogs were sacrificed to the deities.

Reference has already been made to the identification of the four priests at the top of Dresden 25–28 as having the heads of dogs rather than of opossums. It may be suggested that in the rôle of the conductor to the other world the dog is represented as carrying on his back in each case the year which has just been completed and therefore is dead. This, of course, would necessitate the identification of god B, the jaguar, god E, and god A as representing in turn the four years.

The dog, according to Sahagun's account (p. 360) was looked upon as the "Fire God's animal," and as an emblem of fire. This idea is seen frequently in the Maya manuscripts where the dog with firebrands in his paws or attached to his tail is coming head downward from a line of constellation signs, as in Dresden 36a (Pl. 37, fig. 3), 40b (Pl. 37, fig. 1) or is standing beneath similar signs as in Dresden 39a (Pl. 37, fig. 2) and probably in Tro-Cortesianus 13a. His tail alone has the firebrand in Tro-Cortesianus 36b. Firebrands are carried by figures which have been identified by us as dogs in Tro-Cortesianus 24c (Pl. 37, fig. 6), 25c, and 90a. Here the animal is represented as in the air holding his firebrands over a blazing altar beside which god F is seated. In two out of the four cases, F is shown as dead. The dog in these latter examples has his eye composed of the *Akbal* sign. This same glyph can also be made out with difficulty on the forehead of the dog shown in Dresden 36a (Pl. 37, fig. 3). As has been noted, *Akbal* means night and possibly death as well. It is certain that destruction is indicated in the preceding examples as well as in Tro-Cortesianus 87a and 88a (Pl. 37, fig. 4) where the dog is holding four human figures by the hair.

Beyer (1908, pp. 419–422) has identified the dog as the

*"Donde sacrificavan un perro, manchado por la color del cacao . . . y ofrecianles yguanas de las azules y ciertas plumas de un paxaro."

Pleiades and various other suggestions have been made that the dog represents some constellation. The more common form of spotted dog is shown as a single *tonalamatl* figure in Tro-Cortesianus 25d and 27d (Pl. 36, fig. 14) and an unspotted variety in Dresden 7a (Pl. 37, fig. 10). The dog is frequently shown as copulating with another animal or with a female figure. In Dresden 13c (Pl. 37, fig. 7) the second figure is a vulture, in Dresden 21b (Pl. 37, fig. 5) it is a woman and also in Tro-Cortesianus 91c (Pl. 36, fig. 12).

The same animal appears also in a number of scenes not included in the preceding. In Tro-Cortesianus 88c (Pl. 36, fig. 1) a dog is seated on a crab and seems to be connected with the idea of the north as this sign is noted above the figure; in Tro-Cortesianus 66b (Pl. 36, fig. 3) a dog and another animal (Pl. 32, fig. 3) are seated back to back under a shelter; in Tro-Cortesianus 30b a dog is seated on the right foot of the woman from whose breasts water is streaming; in Dresden 29a (Pl. 37, fig. 12) god B is shown seated on a dog; and, finally, in Dresden 30a (Pl. 37, fig. 9) god B holds the bound dog by the tail over an altar.

The dog appears from numerous references to be used in connection with a prayer for rain. Comargo (1843) in his history of Tlaxcallan states that when rain failed, a procession was held in which a number of hairless dogs were carried on decorated litters to a place devoted to their use. There they were sacrificed to the god of water and the bodies were eaten.

The glyphs associated with the dog are interesting as we have, as in the case with the deer, one showing a realistic drawing of a dog's head in Tro-Cortesianus 91d (Pl. 37, fig. 13) and several others far more difficult of interpretation. Pl. 37, fig. 11, seems to stand for the dog as it is found in several places where the dog appears below, Dresden 21b, 40b. It is thought by some to represent the ribs of a dog which appear in somewhat similar fashion in Pl. 37, fig. 8. Some of the

glyphs in the codices for the month *Kankin* show the same element (text figs. 8–10).

The Nahua day sign *Itzcuintli* signifies dog and corresponds to the Maya *Oc* (Pl. 36, figs. 9–11). This in turn is considered by many to stand for the dog as the animal of

FIGS. 8, 9, 10.

GLYPHS FOR MAYA MONTH KANKIN (RIBS OF DOG).

death and signifies the end. The sore, cropped ears of the domesticated dog are supposed to be represented in this sign, *Oc*. Nahua and other day signs for *Itzcuintli* (dog) are shown in Pl. 36, figs. 4, 6, 13.

BEAR (*Ursus machetes; U. horriaeus*). In northern Mexico, in Chihuahua and Sonora, occur a black bear (*Ursus machetes*) and the Sonoran grizzly (*U. horriaeus*). It is unlikely that the Mayas had much acquaintance with these animals since they range more to the northward than the area of Maya occupation. Stempell has identified as a bear, a figure in Dresden 37a (Pl. 35, fig. 3). This represents a creature with the body of a man walking erect but with the head apparently of some carnivorous mammal, as shown by the prominent canine tooth. This appears as a *tonalamatl* figure. The resemblance to a bear is not very clear. Less doubt attaches to the figure shown in Pl. 35, fig. 4, which seems almost certainly to depict a bear. The stout body, absence of a tail, the plantigrade hind feet, and stout claws, all seem to proclaim it a bear of one of the two species above mentioned. This picture is found in connection with one of the warriors shown in the bas-relief of the Lower Chamber of the Temple of the Tigers at Chichen Itza. It seems clearly to designate the figure in much the same way as figures are

named in the Mexican writings, *i.e.*, by having a glyph showing this nearby. Attention has already been called to the fact that here at Chichen Itza, and, especially on this bas-relief, there is much which shows a strong influence from the north. The two figures in Tro-Cortesianus 43a are probably bears. Förstemann (1902, p. 68) considers that they are men masked as *Chacs* or *Bacabs*.

LEAF-NOSED BAT (*Vampyrus spectrum; Artibeus jamaicensis;* or *Phyllostomus hastatus panamensis*). Several remarkably diabolical representations of bats (Maya, *soɔ*, usually written *zotz*) occur among the Maya remains. These all show the prominent nose leaf distinguishing the family *Phyllostomatidae* and, as the Mayas probably used the largest and most conspicuous of the native species for artistic representation, it is likely that some one of the three species above mentioned is the one here shown.

The bat had a place in the Maya pantheon. One of the

FIGS. 11, 12, 13, 14.

GLYPHS FOR MAYA MONTH ZOTZ (BATS).

months of the Maya year (*Zotz*) was named after this animal and the glyph for this month shows the characteristic nasal appendage. This is to be seen more clearly in the glyphs selected from the stone inscriptions (Pl. 38, figs. 1, 2, 4–6) than in those from the codices (text figs. 11–14) although the nose leaf is still visible in the latter. The day sign *Akbal* (night) occurs as the eye in the figures from the manuscripts. A carving showing the whole body of the bat is used as a glyph in Stela D from Copan (Pl. 38, fig. 3). This may also represent the Bat god who is associated with the underworld, "the god of the caverns." This god is pictured on the "Vase of Chama" (Pl. 38, fig. 7) figured by Dieseldorff (1904, pp.

665–666) and by Gordon (1898, Pl. III). Seler (1904a) has discussed the presence of this god among the Mayas, the Zapotecs, and the Nahuas. The bat does not seem to occur in the Maya manuscripts as a god, although there are glyphs which seem to refer to this god (Dresden 17b), as pointed out by Seler, when there is no other representation of this deity.

No doubt in the times of the Maya civilization, these bats haunted the temples by day as they do now, and thus became readily endowed with a religious significance.

CAPUCHIN MONKEY (*Cebus capucinus*,—*C. hypoleucus* Auct.) With the possible exception of one or two figures,

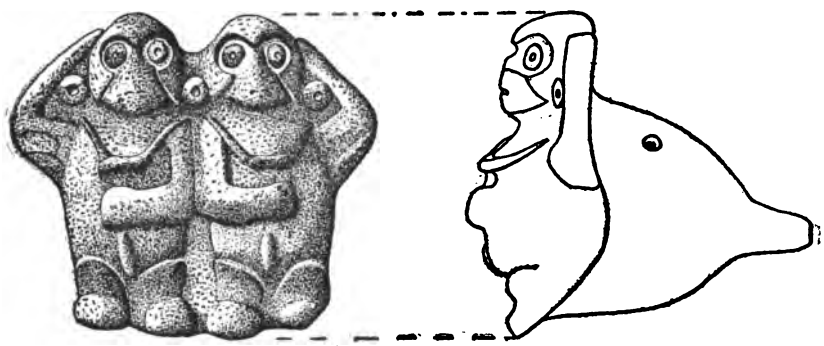

FIG. 15.
POTTERY WHISTLE, APE. FROM ULOA VALLEY, HONDURAS.

monkeys (Maya, *maaš* or *baaɔ*) are not represented in the Maya codices examined. In Tro-Cortesianus 88c (Pl. 39, fig. 4) occurs a curious nondescript animal with what seem to be hoofs on the forefeet, a somewhat bushy tail of moderate length, and a head that appears to be distinctly bonneted, somewhat as in the representations of the capuchin. Stempell regards this as a monkey, though recognizing that the short bushy tail is unlike that of any Central American species. The figure seems quite as likely a peccary or possibly a combination of a deer with some other animal. A glyph (Pl. 39, fig. 5) found directly above the figure just referred

to, suggests a monkey, though it cannot be surely identified. A pottery whistle from the Uloa Valley (text fig. 15) shows two monkeys standing side by side with a posterior extension for the mouth piece. Their heads are shaped as in other representations of this monkey with a distinct cap or bonnet and facial discs. A pottery stamp from the same locality shows a monkey with a long tail (Gordon, 1898, Pl. 11, fig. f). It recalls the drawings of monkeys given by Strebel (1899, Pls. 1–4).

In the Nuttall Codex are numerous heads and a few other figures of a monkey, which from the erect hair of the crown, curling tail, and distinctly indicated facial area must be the common bonneted or capuchin monkey of Central America. This species does not occur in Yucatan. What is undoubtedly the same animal is shown as a head glyph in Pl. 39, fig. 8, from the Aubin manuscript. The identifications of the head-forming glyphs in the Nuttall and the Aubin manuscripts

FIGS. 16, 17, 18, 19.

GLYPHS FOR MAYA DAY CHUEN.

are certainly correct as the Nahua day sign (*Oçomatli*) means ape.

Text figs. 16-19, show some of the signs for the day *Chuen* from the Maya codices. This is the day corresponding to the day Oçomatli of the Nahuas. There is little resembling an ape in the Maya signs although it has been remarked that the sign may show the open jaws and teeth of this animal.

Förstemann (1897) as noted by Schellhas (1904, p. 21) alludes to the fact that the figure of god C, which occurs also in the sign for the north, in the *tonalamatl* in Dresden 4a–10a occurs in the day *Chuen* of the Maya calendar, and this corre-

sponds to the day *Oçomatli*, the ape, in the Nahua calendar. This would suggest a connection between god C and the ape and this may be seen in the glyphs for god C (text figs. 20–24). Förstemann sees "an ape whose lateral nasal cavity (peculiar to the American ape or monkey) is occasionally represented plainly in the hieroglyph picture." He also associates god C with the constellation of Ursa Minor.

FIGS. 20, 21, 22, 23, 24.
GLYPHS OF GOD C.

It will be seen from the detailed examination of the fauna shown in the codices that after all a comparatively small part of the animal life of the country occupied by the Maya speaking peoples is represented. The drawings in some cases are fairly accurate, so that there is little difficulty in determining the species intended by the artist. At other times, it is hazardous to state the exact species to which the animal belongs. It is only in a comparatively small number of cases, however, that there is any great doubt attached to the identification. It will be noted that the drawings of the Dresden manuscript are much more carefully and accurately done than those of the Tro-Cortesianus. A greater delicacy and a more minute regard for detail characterize the Dresden drawings in general.

In the animals selected for reproduction by the Mayas, only those were taken which were used either in a purely religious significance for their mythological character (and here naturally there is to be noted an anthropomorphic tendency) or animals were chosen which were employed as offerings to the many different gods of the Maya pantheon. The religious character of the whole portrayal of animal life in the codices is clearly manifest, and it is this side of the subject which will come out more clearly as the manuscripts are better known.

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PLATE 1

MOLLUSCA

Fasciolaria gigantea

1. Man emerging from shell, Dresden 41b.
2. Same, Borgia 4.
3. Bologna 4.
4. Dresden 37b.
5. Vaticanus 3773, 66.
6. Nuttall 16.
7. Sign for zero, Dresden 64.
8. Glyph, Dresden 41b.
9. Nuttall 16.

Oliva

10, 11. Sign for zero, Dresden 63.
12. Same, Dresden 55b.

Other Mollusca

13. Sign for zero, Dresden 54b.
14. Same. Bivalve, Dresden 63.
15. Bivalve, Nuttall 25.
16. Nuttall 49.
17. Nuttall 23.
18. Nuttall 16.
19. Nuttall 36.
20. Nuttall 75.
21. Bivalve closed, seen in profile, Nuttall 75.
22. Same, Nuttall 25.
23. Probably bivalve, Nuttall 16.
24. Same. Nuttall 36.

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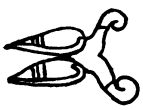

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PLATE 2

INSECTA

HONEY BEE (*Melipona*)

1. Possibly a drone, Tro-Cortesianus 108a.
2, 3. Tro-Cortesianus 108a.
4, 6 Bees more conventionalized, Tro-Cortesianus 80b.
5. Bee and honey comb, Tro-Cortesianus 109c.
7. Honey combs, apparently in a hive, Tro-Cortesianus 11c.
8. Maya day sign, *Cauac*, possibly representing a honey comb, Tro-Cortesianus 106b.
9. Tro-Cortesianus 103c.
10. Honey combs in a hive, Tro-Cortesianus 104a.
11. Bee and honey comb, Tro-Cortesianus 109c.

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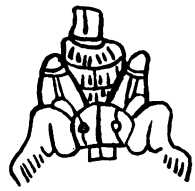

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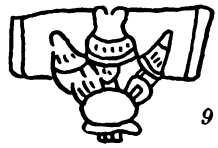

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PLATE 3

INSECTA AND MYRIAPODA

1. Maggots, probably of Blowfly (*Sarcophaga*), Tro-Cortesianus 27d.
2. Same, Tro-Cortesianus 24d.
3. Larva of *Acentrocneme kollari*, Tro-Cortesianus 28c.
4. Conventionalized insect, possibly a hornet, Nuttall 3.
5. Conventionalized insect, unidentified, Nuttall 19.
6. Same, Nuttall 55.
7. Same, Nuttall 51.
8. Butterfly or moth, Nuttall 19.
9. Butterfly, Aubin.
10. Maya day sign, *Akbal*, possibly representing the head of a centipede.
11. Glyph belonging to god D, apparently composed of signs for centipede, Dresden 7b.
12. Glyph for god D, Dresden 14b.
13. Glyph, Dresden 44b.
14. Same, Dresden 27a.
15. Centipede in connection with head-dress of god D, Dresden 15c.
16. Glyph, Dresden 9b.
17. Same, Dresden 15c.
18. Centipede in connection with head-dress of god D, Dresden 7c.

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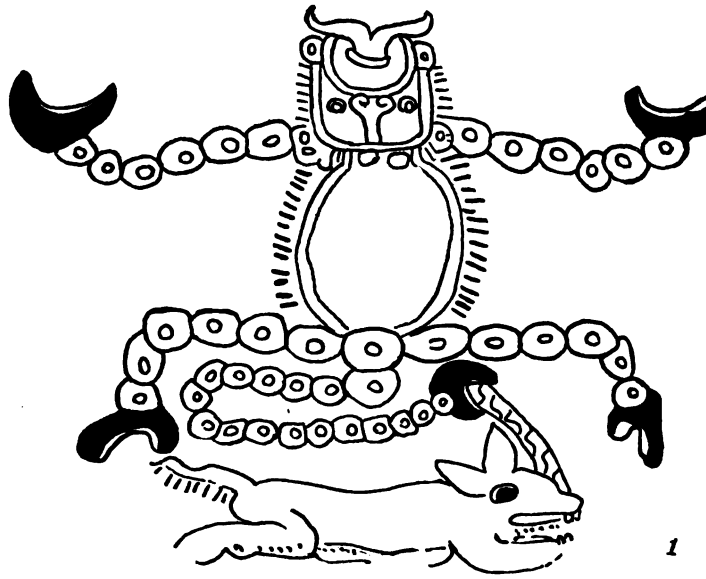
PLATE 4

ARACHNOIDEA, ARACHNIDA, CRUSTACEA

1. Scorpion and deer, Tro-Cortesianus 48c.
2. Scorpion with sting conventionalized as a hand, Tro-Cortesianus 44c.
3. Scorpion highly conventionalized, Nuttall 22.
4. Spider, possibly a tarantula, Borbonicus 9.
5. Crayfish, Nuttall 16.
6. Crab, Nuttall 37.



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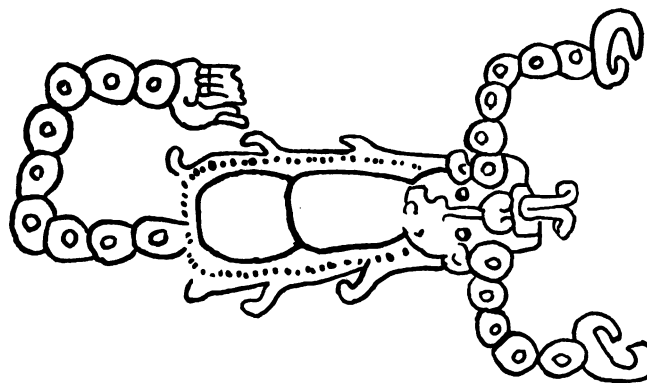

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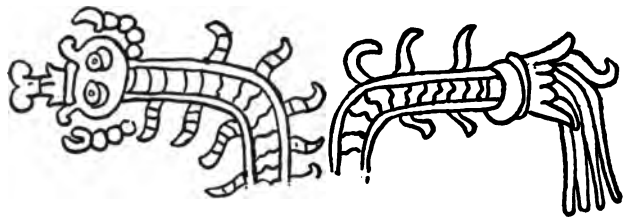
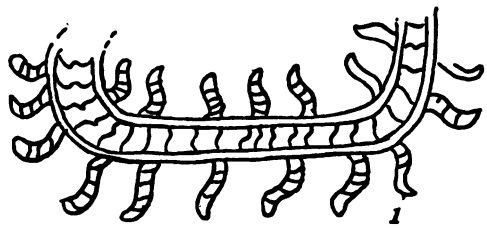
PLATE 5

MYRIAPODA, PISCES

1. Parts of a conventionalized centipede with quetzal tail, Vaticanus 3773, 13.
2. Fish with teeth, Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III, Pl. 48).
3. Fish captured by heron, Dresden 36b. (Compare Pl. 15, fig. 5.)
4. Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III,Pl. 45).
5. Fish.
6. Pottery fish, Chajcar (Maudslay, IV, Pl. 93).
7. Same.
8. Fish as offering, Tro-Cortesianus 3a.
9. Same, Dresden 29b.





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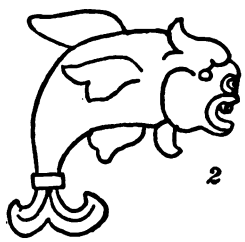

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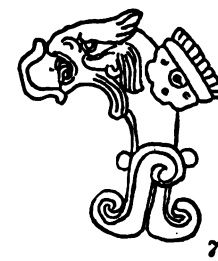

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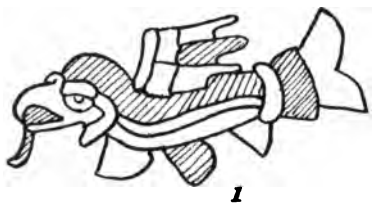
PLATE 6

PISCES

1. Possibly a flying-fish (*Exocetus*), Nuttall 75.
2. Palenque, Temple of the Cross (Maudslay, IV, Pl. 68).
3. Nuttall 36.
4, 5. Glyphs, possibly of a shark, Dresden 40a.
6. Fish as offering, Dresden 27c.
7. Fish without dorsal fins, possibly an eel (*Muraena*), Dresden 65b.
8. Fish as offering, Dresden 23b.
9. Pottery animal from Santa Rita (Gann, 1897–1898, Pl. 34).
10. Dresden 44c.
11. Nuttall 16.
12. Palenque, Palace (Maudslay, IV, Pl. 11).
13. Fish as offering, Dresden 33a.
14. Fish as part of the Great Cycle glyph, Copan, Stela C, north (Maudslay, I, Pl. 41).
15. Same, Copan, Stela C, south (Maudslay, I, Pl. 41.)
16. Same, Copan, Stela D (Maudslay, I, Pl. 48).
17. Same, Copan, Stela C, south (Maudslay, I, Pl. 41).



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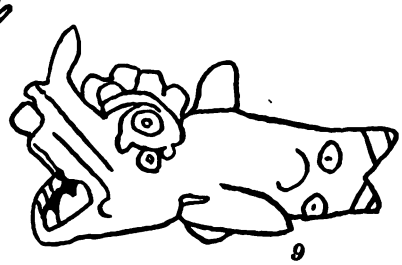

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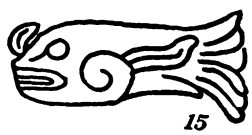

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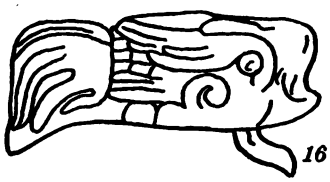

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PLATE 7

AMPHIBIA

1. Frog (*Rana*), Tro-Cortesianus 31a.
2, 3. Same, Tro-Cortesianus 101d.
4. Probably a toad (*Bufo*), Copan, Oblong altar (Maudslay, I, Pl. 114).
5. Frog or toad, Tro-Cortesianus 17b.
6. Frog and fish, Copan, Altar O (Maudslay, I, Pl. 85).
7. Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III, Pl. 46).

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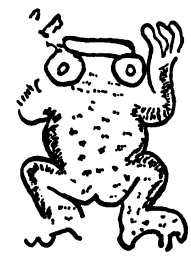

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PLATE 8

AMPHIBIA, REPTILIA

1. God F representing a tree-toad (*Hyla eximia*), Tro-Cortesianus 26b.
2. Glyph evidently belonging to fig. 3, Tro-Cortesianus 26a.
3. Same as fig. 1, Tro-Cortesianus 26a.
4. Snake, Nuttall 6.
5. Same, Nuttall 45.
6. Same, Nuttall 37.
7. Snake used as head-dress of a woman, Dresden 39b.
8. Same, Dresden 23b.
9. Same, Dresden 43b.
10. Same, Dresden 22b.
11. Same, Dresden 9c.
12. Same, Dresden 15b.
13. Same, Dresden 18a.
14. Dresden 42a.
15. Same as figs. 7–13, Dresden 20a.

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PLATE 9

REPTILIA

RATTLESNAKE (*Crotalus*)

1. Tro-Cortesianus 33b.
2. Nahua day sign, *Couatl*, Aubin 10.
3. Tro-Cortesianus 52c.
4. Tro-Cortesianus 40b.
5. Chichen Itza, Temple of the Tigers, Painted Chamber (Maudslay, III, Pl. 40).
6. Nuttall 29.
7. Glyph representing rattles, Tro-Cortesianus 106c.
8. Tro-Cortesianus 100d.
9. Chichen Itza, Temple of the Tigers, Painted Chamber (Maudslay, III, Pl. 40).
10. Nuttall 54.

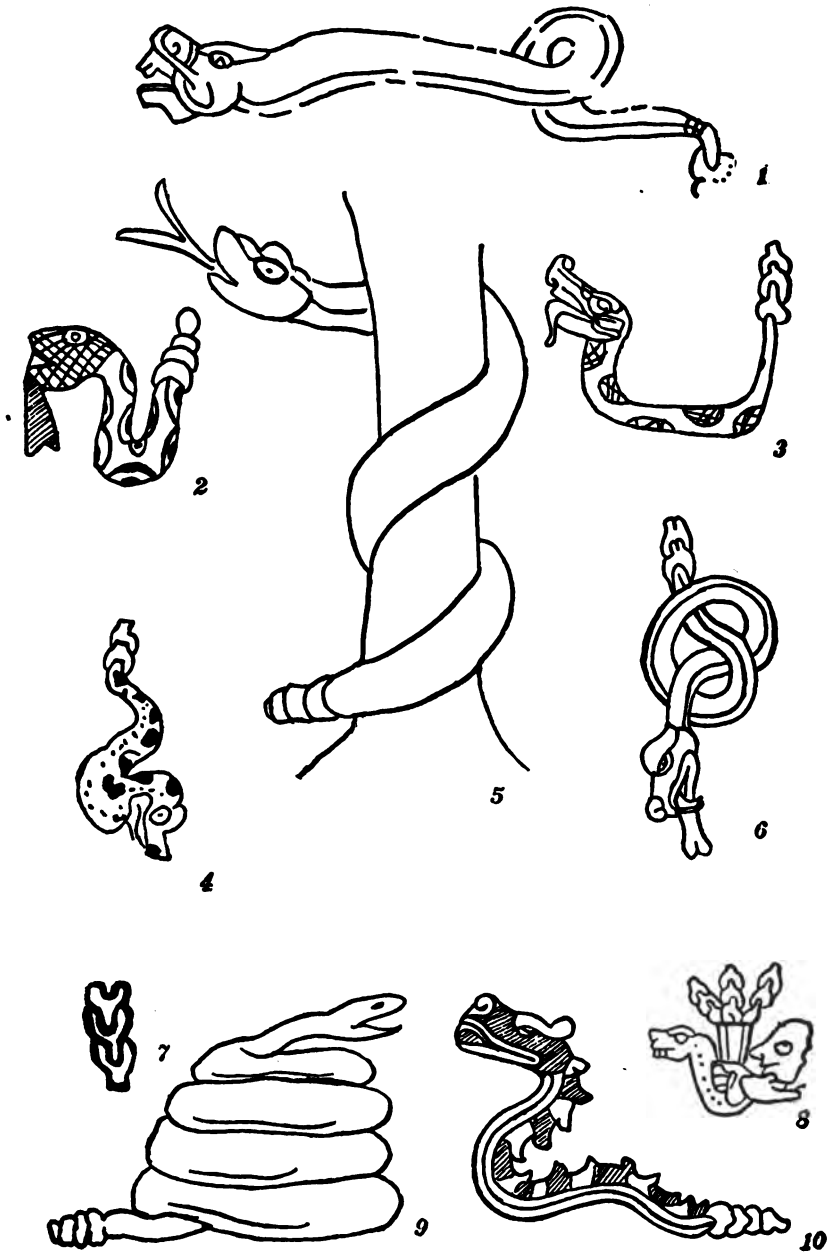
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PLATE 10

REPTILIA

Serpents

1. Tree snake (possibly *Lachesis*), Dresden 27c.
2. Nuttall 37.
3. Dresden 57b.
4. Nuttall 5.
5. Nuttall 37.
6. Nuttall.
7. Serpent in connection with long number series, Dresden 62.
8. Dresden 37b.
9. Dresden 40c.

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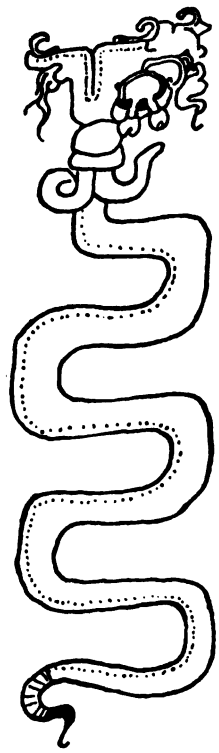

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PLATE 11

REPTILIA

SERPENTS

1. Large snake with conventionalized spots, Tro-Cortesianus 30a.
2. Tro-Cortesianus 31b.

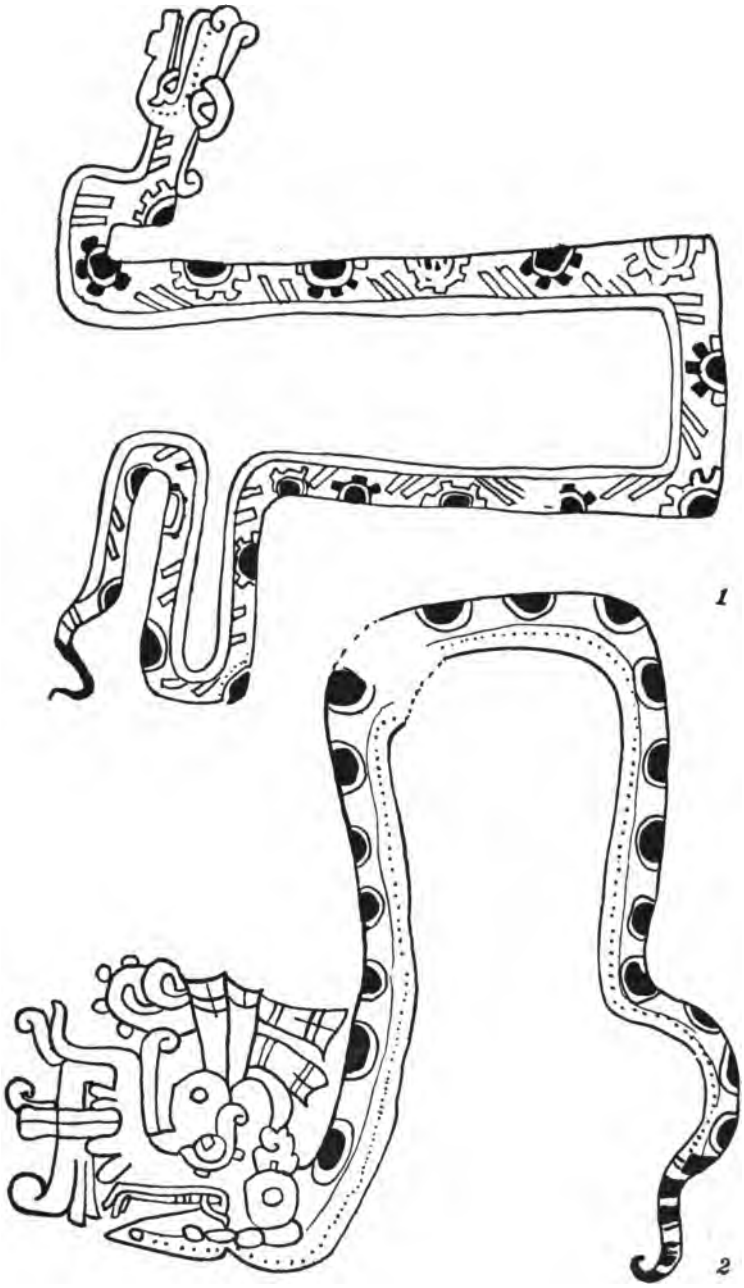
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PLATE 12

REPTILIA

Iguana, Lizards

1. Iguana as offering, Tro-Cortesianus 105c.
2. Iguana, Tro-Cortesianus 3b.
3. Iguana, as offering with *Kan*, Dresden 43c.
4. Same, Tro-Cortesianus 107b.
5. Same, Tro-Cortesianus 6a.
6. Same, Dresden 29b.
7. Offering, possibly representing a lizard, Dresden 27b.
8. Same, Dresden 34a.
9. Lizard used for *Uinal* glyph, Copan, Stela D, gl. 4. (Maudslay, I, Pl. 48).
10. Nahua day sign, *Cuetzpalin* (lizard), Aubin 10.
11. Lizard, Dresden 3a.
12. Nuttall 10.
13. Offering, the portion with serrated margin possibly representing an iguana, Tro-Cortesianus 12b.
14. Lizard, Nuttall 2.

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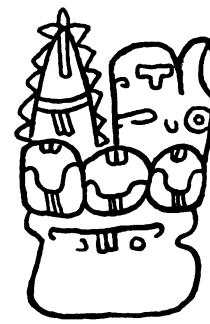

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PLATE 13

REPTILIA

Crocodile (*Crocodilus*)

1. Glyph of the Nahua day sign, *Cipactli*, Nuttall 1.
2. Crocodile represented by head and limb, Nuttall 36.
3. Same as fig. 1, Nuttall 1.
4. Same as fig. 1, Nuttall 4.
5. Same as fig. 1, Nuttall 9.
6. Same as fig. 1, Nuttall 47.
7. Same as fig. 1, Nuttall 1.
8. Nuttall 75.
9. Head of lizard or possibly crocodile used as a *Uinal* glyph, Palenque, Temple of the Foliated Cross (Maudslay, IV, Pl. 82, gl. 6).
10. Head of crocodile, Dresden 52b.
11. Head, possibly of a crocodile, Palenque, Temple of the Foliated Cross (Maudslay, IV, Pl. 82, gl. 0, 4).
12. Conventionalized head of a crocodile, Dresden 53b.

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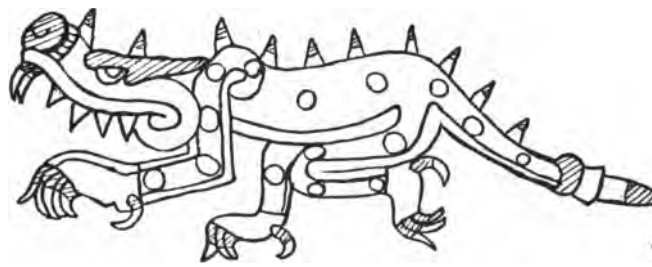

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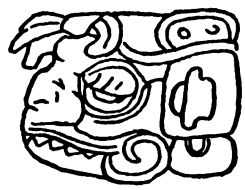

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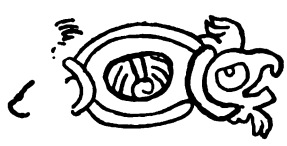
PLATE 14

REPTILIA

Turtles

1. Turtle, Tro-Cortesianus 19b.
2. Same, Tro-Cortesianus 17b.
3. Swimming turtle, Tro-Cortesianus 17a.
4. Possibly representing a turtle, Nuttall 33.
5. Turtle, Tro-Cortesianus 81c.
6. Freshwater turtle (*Chelydra*) with leeches attached, Tro-Cortesianus 72b.
7. Glyph for fig. 3.
8. Glyph.
9. Glyph.
10. Glyph.
11. Turtle, Nuttall 43.
12. Turtle god, *Aac*, Dresden 49.

PLATE 14



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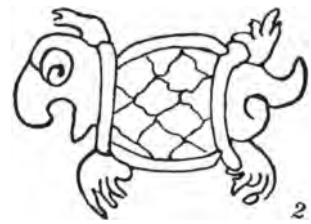

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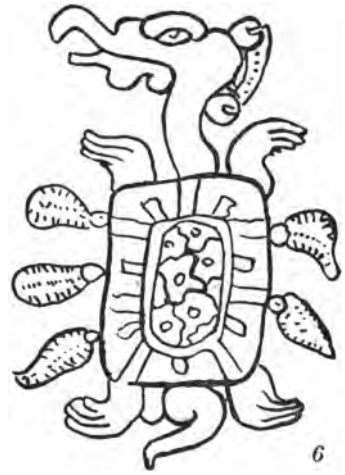

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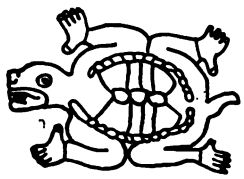

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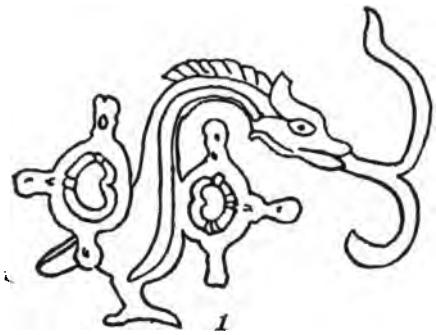
PLATE 15

AVES

Herons Frigate bird

1. Heron, stucco ornament. Palenque, Palace, House B (Maudslay, IV, Pl. 18).
2. Heron head-dress, Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III, Pl. 45).
3. Head and neck of a heron, Dresden 37b.
4. Heron, Nuttall 74.
5. Heron with fish, Palenque, Temple of the Cross, West side panel (Maudslay, IV, Pl. 71).
6. Heron.
7. Heron with a fish as a head-dress, Dresden 36a.
8. Fork-tailed bird, probably a Frigate bird (*Fregata aquila*), Tro-Cortesianus 34a.
9. Same, arranged for offering, Dresden 35a.



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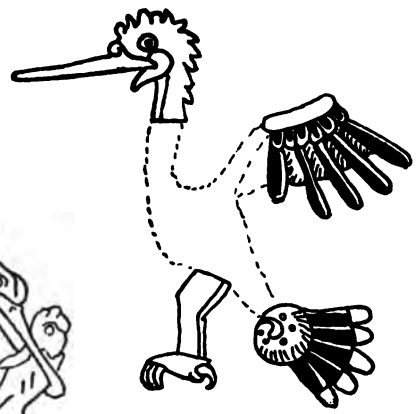

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PLATE 16

AVES

Ocellated Turkey (*Agriocharis ocellata*)

1. Turkey in trap, Tro-Cortesianus 93a.
2. Turkey, Tro-Cortesianus 10b.
3. Turkey snared, Tro-Cortesianus 91a.
4. Tro-Cortesianus 4a.
5. Tro-Cortesianus 95c.
6. Tro-Cortesianus 37b.
7. Vaticanus 3773, 14.
8. Tro-Cortesianus 36a.
9. Whole turkey as offering, Dresden 26c.
10. Head of turkey as offering, Dresden 34a.
11. Same, Tro-Cortesianus 12b.
12. Same, Tro-Cortesianus 105b.
13. Dresden 20a.
14. Head of turkey as offering, Dresden 41c.
15. Same, Tro-Cortesianus 107b.
16. Same, Dresden 29c.
17. Same, Dresden 28c.

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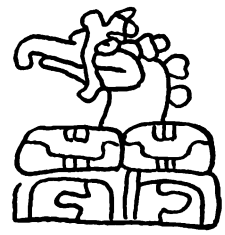

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PLATE 17

AVES

KING VULTURE (*Sarcorhamphus papa*)

1. Tro-Cortesianus 67a.
2. Tro-Cortesianus 22c.
3. God with head of King Vulture, Dresden 19a.
4. King Vulture and Ocellated Turkey, Tro-Cortesianus 85a.
5. Glyph, showing head, Dresden 39c.
6. Same, Tro-Cortesianus 107c.
7. Same, Dresden 38b.
8. Same.
9. King Vulture, tearing out entrails of deer, Tro-Cortesianus 40a.
10. *Tun* period glyph (Maudslay, IV, Pl. 89).
11. Tro-Cortesianus 94c.
12. Tro-Cortesianus 26c.
13. Glyph, Chichen Itza, Monjas, east (Maudslay, III, Pl. 13).

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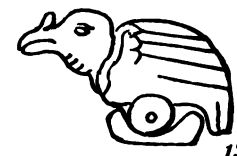

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PLATE 18

AVES.

KING VULTURE (*Sarcorhamphus papa*), BLACK VULTURE (*Catharista urubu*)

1. Glyph of head of King Vulture, Dresden 11b.
2. Glyph for Nahua day sign, *Cozcaquauhtli*, Nuttall 5.
3. Same as fig. 2, Nuttall 41.
4. Same as fig. 2, Nuttall 5.
5. Same as fig. 2, Nuttall 4.
6. Same as fig. 2, showing considerable conventionalization. Nuttall 2.
7. Same as fig. 2, Nuttall 3.
8. Same as fig 2, further reduced, Nuttall 18.
9. Same as fig. 2, Nuttall 3.
10. Same as fig. 2, Nuttall 20.
11. Probably a Black Vulture, Tro-Cortesianus 95c.
12. Black Vulture, Tro-Cortesianus 70a.
13. Same, Dresden 17b.
14. Possibly a Black Vulture, Chichen Itza, Monjas, east (Maudslay, III, Pl. 13).
15. Head of Black Vulture, Nuttall 32.
16. Glyph of head of same, Dresden 54b.
17. Black Vulture, Tro-Cortesianus 36b.
18. Head of same, Tro-Cortesianus 26c.
19. Same, Dresden 39c.
20. Same, Nuttall 19.
21. Same, Nuttall 34.
22. Same, Dresden 37c.
23. Same, Nuttall 27.
24. Same, Nuttall 1.
25. Same, Nuttall 34.
26. Same, Nuttall 9.
27. Same, Tro-Cortesianus 19b.

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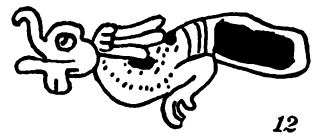
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PLATE 19

AVES.

VULTURES

1. Vulture (probably a King Vulture) tearing at entrails of an animal, Tro-Cortesianus 42a.
2. Nuttall 69.
3. Nuttall 74.
4. Possibly a Black Vulture, Tro-Cortesianus 35b.
5. Tro-Cortesianus 26d.
6. Tro-Cortesianus 26d.
7. Dresden 3a.
8. Glyph, Copan (Maudslay, I, Pl. 16).
9. Glyph, Copan, Altar K (Maudslay, I, gl. 73).
10. Glyph, Tikal, House 9 (Maudslay, III, Pl. 79).
11. Black Vulture and snake, Dresden 36b.
12. Probably vultures, Tro-Cortesianus 100b.
13. Probably a vulture, Tro-Cortesianus 18b.
14. Same, Temple of the Tigers, Lower Chamber, Chichen Itza (Maudslay, III, Pl. 46).

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PLATE 20

AVES

HARPY EAGLE (*Thrasaetos harpyia*)

1. Glyph, Copan (Maudslay, I, Pl. 16, gl. 3).
2. Nuttall 53.
3. Glyph, Copan (Maudslay, I, Pl. 16, gl. 13).
4. Tro-Cortesianus 88c.
5. Part of a head-dress, Dresden 14c.
6. Peresianus 2.
7. Dresden 14b.
8. Eagle with crest feathers tipped by flints, Nuttall
9. Glyph, Tro-Cortesianus 107c.
10. Stone carving, Chichen Itza (Maudslay, III, Pl. 52).
11. Dresden 23c.
12. Possibly an eagle's head, Dresden 43c.
13. Possibly an eagle, Dresden 74.
14. Bologna 7.

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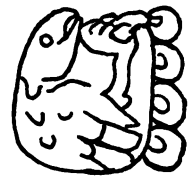

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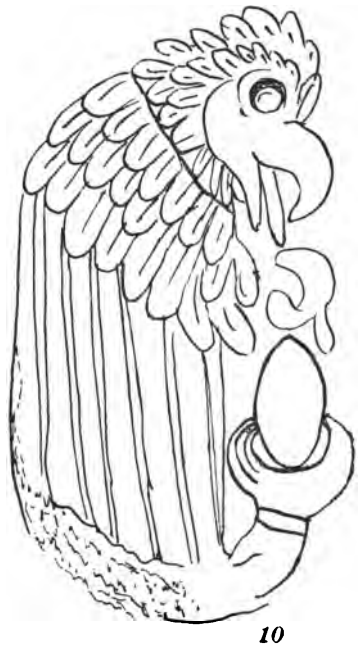

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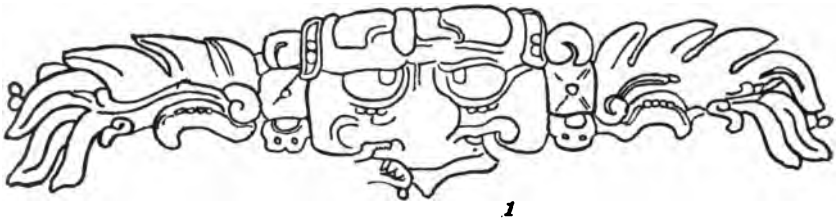
PLATE 21

AVES

YUCATAN HORNED OWL (*Bubo virginianus mayensis*)

1. Owl in flight, Stucco ornament, Palenque, Palace, House E (Maudslay, IV, Pl. 43).
2. Stone carving of owl, Yaxchilan, Stela 4 (Peabody Museum Memoirs, II, Pl. 70).
3. Owl in flight, carved in wood, Tikal, House C, lintel (Maudslay, III, Pl. 78).



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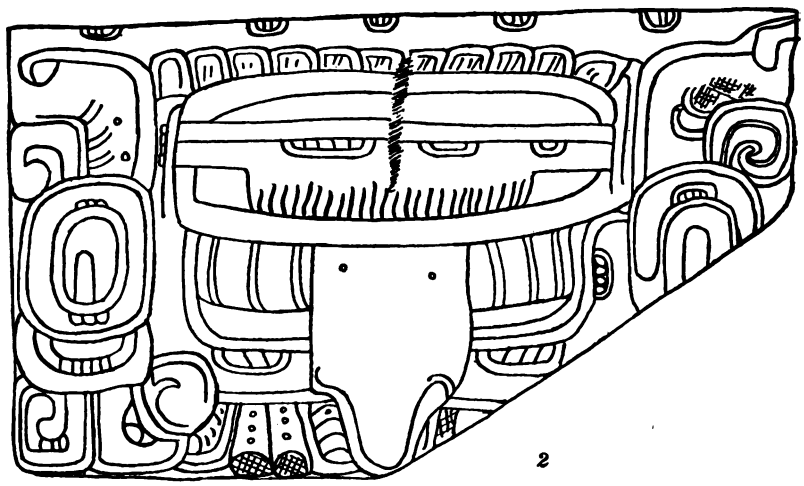

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PLATE 22

AVES

YUCATAN HORNED OWL (*Bubo virginianus mayensis*)

1. Bologna 7.
2. As a head-dress, Tro-Cortesianus 95c.
3. Borgia 7.
4. On end of staff carried by warrior, Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III, Pl. 49).
5. Aubin 13.
6. Head highly conventionalized, Palenque, Temple of the Sun (Maudslay, IV, Pl. 88).
7. Screech-owl (*chiquàtli*), Aubin.

PLATE 22

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PLATE 23

AVES

YUCATAN SCREECH OWL OR MOAN-BIRD (*Otus choliba thompsoni*)

1. Dresden 7c.
2. Tro-Cortesianus 66a.
3. Dresden 11a.
4. As a head-dress, Tro-Cortesianus 94c.
5. As a head-dress, Dresden 18b.
6. Glyph associated with Moan-bird, Dresden 7c.
7. Same, Dresden 7c.
8. Dresden 10a.
9. Peresianus 10.
10. Peresianus 5.
11. Glyph representing head, Dresden 38c.
12. Same, Dresden 8b.
13. Same, Dresden 53b.
14. Same, Dresden 16c.
15. Glyph possibly representing Moan-bird, Dresden 38c.
16. Glyph of head, Dresden 53b.
17. Glyph associated with Moan-bird.
18. Tro-Cortesianus 73b.
19. As a head-dress, Dresden 16c.
20. As a head-dress, Tro-Cortesianus 95c.
21. Glyph associated with Moan-bird, Dresden 7c.

PLATE 23

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PLATE 24

AVES

COPPERY-TAILED TROGON OR QUETZAL (*Pharomacrus mocinno*)

1. Head-dress with crest feathers shown as knobs, Dresden 7c.
2. Head-dress, Dresden 13b.
3. Same, Dresden 16c.
4. Tro-Cortesianus 100b.
5. Tro-Cortesianus 70a.
6. Head-dress, Tro-Cortesianus 94c.
7. Nuttall 33.
8. Conventionalized tail as a head ornament, Dresden 20c.
9. Vaticanus 3773, 17.
10. Glyph, Palenque, Temple of the Sun (Maudslay, IV, Pl. 89, gl. O, 9).
11. Trogon descending on a sacrifice, Bologna 8.
12. Tro-Cortesianus 36b.
13. Glyph, Copan (Maudslay, I, Pl. 111, gl. 54).
14. Glyph apparently representing a trogon's head, Dresden 20c.
15. Same, Dresden 9b.
16. Same, Dresden 3a.
17. Head, Nuttall 43.
18. Tro-Cortesianus 26c.
19. Figure with head ornament resembling a trogon glyph, Dresden 20c.

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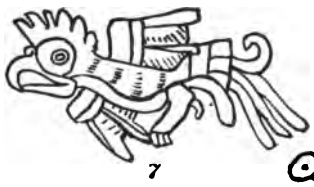
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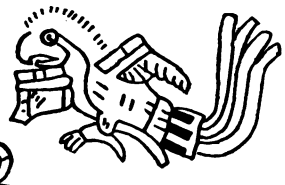
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PLATE 25

AVES

BLUE MACAW (*Ara militaris*)

1. Figure with macaw head and holding firebrands, Dresden 40b.
2. Head-dress, Dresden 16c.
3. Tro-Cortesianus 12a.
4. Glyph, Copan, Stela 11 (Maudslay, I, Pl. 112, gl. 12).
5. Same, Copan, Stela B (Maudslay, I, Pl. 38).
6. Glyph used in connection with fig. 1.
7. Glyph.
8. Stone carving of upper mandible and head, Copan, Stela B (Maudslay, I, Pl. 37).
9. Head, probably of a turtle, month sign *Kayab*, Quirigua, Stela A (Maudslay, II, Pl. 7, gl. 14).
10. Head, probably of a macaw, Copan, Altar Q (Maudslay, I, Pl. 93).
11. Tro-Cortesianus 37b.
12. Head, probably of a macaw, Copan, Stela A (Maudslay, I, Pl. 30, gl. 19).
13. Tro-Cortesianus 94c.

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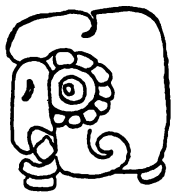

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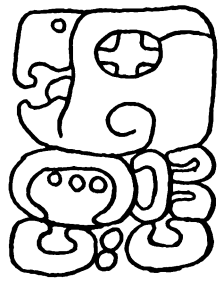

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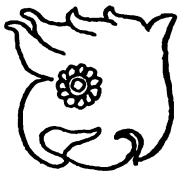

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PLATE 26

AVES

Parrots, Turkeys

1. Macaw as a head-dress, Tro-Cortesianus 26c.
2. Bird of sacrifice, doubtless an Ocellated Turkey (*Agriocharis*) Dresden 25c. (Compare also Dresden 26c 27c, 28c.)
3. Head-dress, probably a macaw, Copan, Altar Q (Maudslay, I, Pl. 92).
4. Possibly a parrot (*Amazona*), Nuttall 4.
5. Head-dress, head of a macaw, Tro-Cortesianus 89a.
6. Head-dress, possibly representing a parrot, Dresden 12b.
7. Possibly a parrot (*Amazona*), Nuttall 71.
8. Glyph representing a macaw's head, Tikal, Temple C (Maudslay, III, Pl. 78).
9. Parrot-like head-dress, Dresden 19a.
10. Possibly a macaw, Tro-Cortesianus 37b.
11. Parrot-like head-dress, Dresden 11b.
12. Bird of sacrifice, probably an Ocellated Turkey or a Chachalaca, Nuttall 22.
13. Parrot-like head-dress, Dresden 11a.
14. Head of Ocellated Turkey or a Chachalaca, Nuttall 5.

PLATE 26

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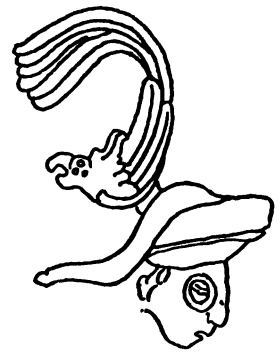

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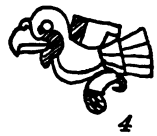

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PLATE 27

AVES

MISCELLANEOUS

1. Bird of sacrifice, an Ocellated Turkey or a Chachalaca, Nuttall 2.
2. Same, Nuttall 16.
3. Same, Nuttall 19.
4. Same, Nuttall 1.
5. Woodpecker possibly *Campephilus imperialis*, Nuttall 74.
6. Same, Nuttall 71.
7. Possibly a Raven (*Corvus corax sinuatus*), Nuttall 48.
8. Parrot (*cocho*), Aubin 11.
9. Same, Aubin 13.
10. Turkey-cock (*uexolot*), Aubin 11.
11. Same, Aubin 13.

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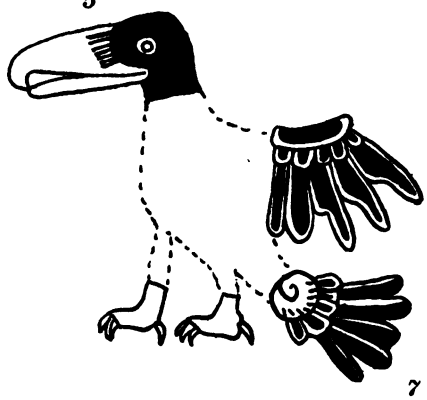

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PLATE 28

Various Animals

1. Earthenware vessel representing a tapir (*Tapirella*) with a necklace of Oliva shells (Seler, 1904b, p. 106, fig. 23).
2. Stone carving, possibly of a King Vulture (*Sarcorhamphus papa*), Copan, Altar T (Maudslay, I, Pl. 96).
3. Stone carving, possibly a lizard, Copan, Stela 6 (Maudslay I, Pl. 107).
4. Stone carving, probably a jaguar (*Felis onca hernandezi*), Copan, Stela 2 (Maudslay, I, Pl. 102).
5. Stone carving of a Black Vulture (*Catharista urubu*), Copan, Stela D (Maudslay, I, Pl. 48).
6. Lizard (?) attacked by two birds (?) perhaps vultures, Quirigua, Altar B (Maudslay, II, Pl. 15).

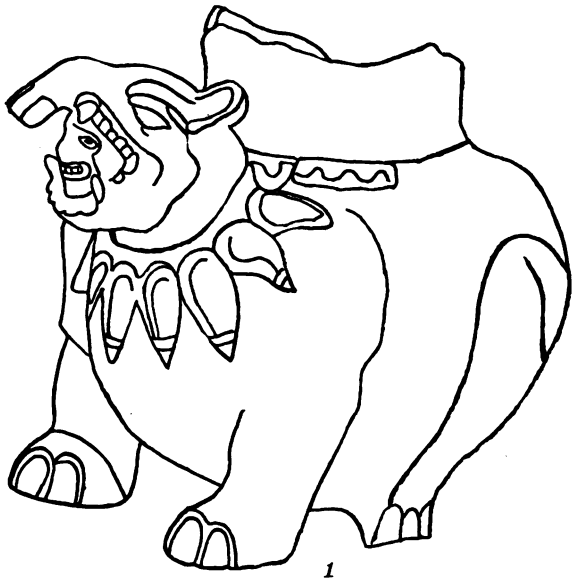

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PLATE 29

MAMMALIA

Armadillo and Miscellaneous

1. Nine-banded Armadillo (*Tatu novemcinctum*), Tro-Cortesianus 103a.
2. Same, Tro-Cortesianus 92d.
3. Same, Tro-Cortesianus 103a.
4. Armadillo captured in a pitfall, Tro-Cortesianus 48a.
5. Undetermined animal, Dresden 14c.
6. Undetermined animal, possibly a frog or a marsupial, Tro-Cortesianus 33a.
7. Rodent, Nuttall 11.
8. Undetermined animal, Tro-Cortesianus 24d.

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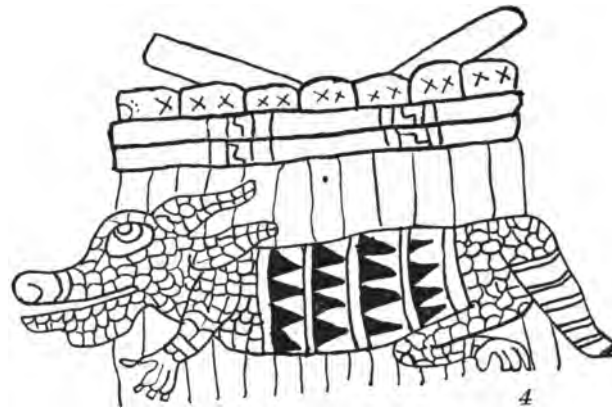

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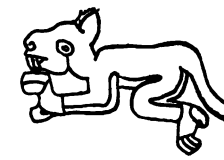

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PLATE 30

MAMMALIA

Deer, Hare

1. Yucatan deer, caught in a snare, Tro-Cortesianus 48b.
2. Yucatan brocket (*Mazama pandora*) caught in a pitfall, Tro-Cortesianus 92a.
3. Glyph for hare or rabbit, Nuttall 16.
4. Same, Nuttall 5.
5. Yucatan deer, Dresden 60a.
6. Same, Tro-Cortesianus 30b.
7. Hare or rabbit, Nuttall 22.
8. Same, Dresden 61

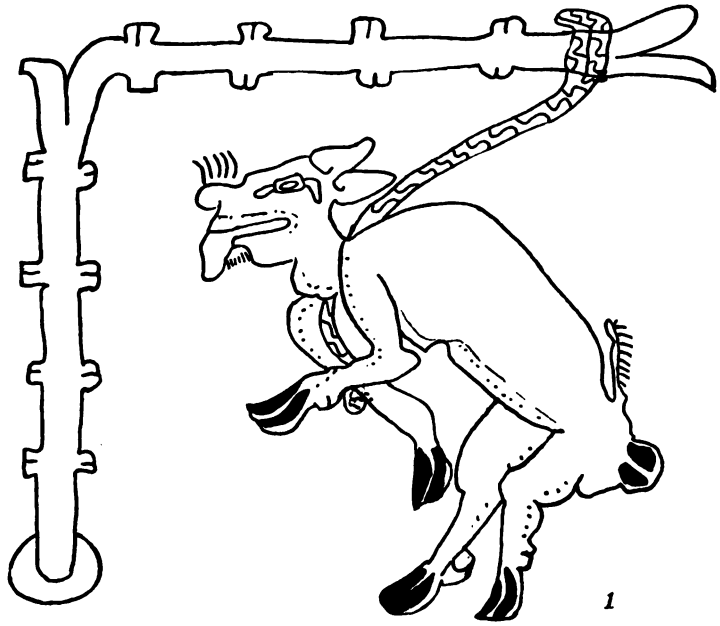

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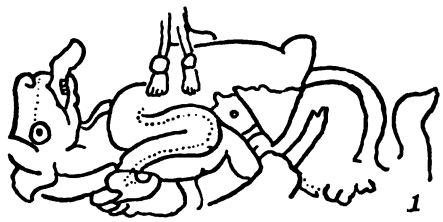
PLATE 31

MAMMALIA

YUCATAN DEER (*Odocoileus yucatanensis*)

1. Doe, Dresden 45c.
2. Same, Fégerváry-Mayer 26.
3. Same, Tro-Cortesianus 29c.
4. Same, Nuttall 50.
5. Same captured in snare, Tro-Cortesianus 86a.
6. Head-dress of god M, Tro-Cortesianus 50b.
7. Same, Tro-Cortesianus 51c.
8. Doe, Tro-Cortesianus 2b.
9. Head of same, Nuttall 43.
10. Head of doe as sacrifice, Tro-Cortesianus 77.
11. Same, Peresianus 10.
12. Haunch of venison as a sacrifice, Dresden 35a.
13. Same, Tro-Cortesianus 105b.
14. Same, Dresden 28c.
15. Same, Tro-Cortesianus 108a.



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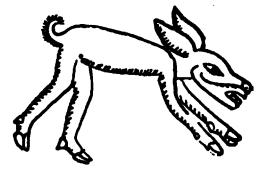

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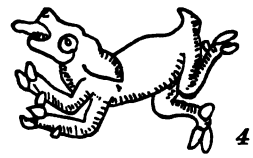

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PLATE 32

MAMMALIA

YUCATAN PECCARY (*Tayassu angulatum yucatanense*)
YUCATAN DEER (*Odocoileus yucatanensis*)

1. Peccary, Nuttall 79.
2. Same, Dresden 68a.
3. Combination, a peccary's head and forefoot, with long tail and hindfoot without hoofs, Tro-Cortesianus 66a
4. Peccary, Dresden 45b.
5. Man with peccary head, Copan, Sela D, east (Maudslay, I, Pl. 46).
6. Combination animal, with hoofs and dorsal crest of a peccary and scales of a reptile, Dresden 75.
7. Peccary, Nuttall 9.
8. Yucatan deer, with conventionalized antler, glyph for Nahua day sign, *Maçatl*, Nuttall 26.
9. Same, Peresianus 5.
10. Glyph for Nahua day sign *Maçatl*, Aubin 10.
11. Same, Nuttall 5.
12. Deer, Copan, Stela N, East (Maudslay, I, Pl. 79).

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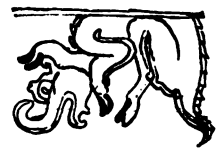

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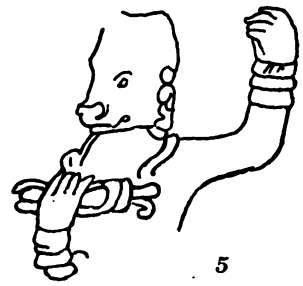

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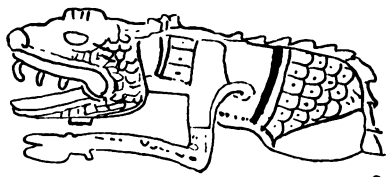

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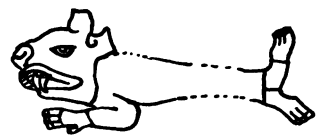

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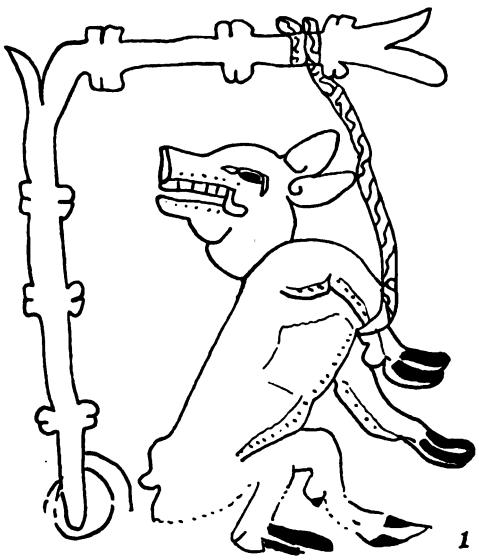
PLATE 33

MAMMALIA

YUCATAN PECCARY (*Tayassu angulatum yucatanense*)

1. Peccary caught in a snare, Tro-Cortesianus 49c.
2. Glyph, Chichen Itza, Monjas, East (Maudslay, III, Pl. 13).
3. Head as a head-dress, Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III).
4. Peccary caught in a snare, Tro-Cortesianus 93a.
5. Tro-Cortesianus 30b.
6. Dresden 62.
7. Glyph representing a peccary's head, Dresden 45b.
8. Same, Dresden 43b.
9. Peccary caught in a snare, Tro-Cortesianus 49a.



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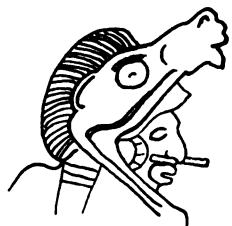

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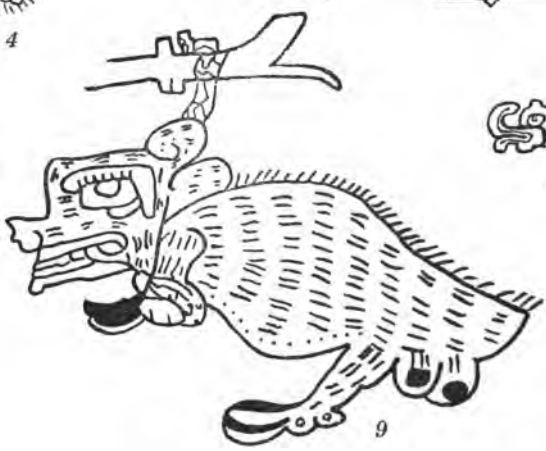

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PLATE 34

MAMMALIA

JAGUAR, PUMA

1. Jaguar (*Felis hernandezi*), Nuttall 24.
2. Man seated in the open mouth of an animal, possibly a jaguar, Tro-Cortesianus 20a.
3. Nahua day sign, *Oceolotl*, Aubin 9.
4. Pot representing a jaguar or puma (Gann, 1897–1898, Pl. 34).
5. Probably a puma (*Felis bangsi costaricensis*), Chichen Itza, Temple of the Tigers, Painted Chamber (Maudslay, III, Pl. 40).
6. Chichen Itza, Temple of the Tigers, Lower Chamber (Maudslay, III, Pl. 50).
7. Probably a puma, Dresden 47.

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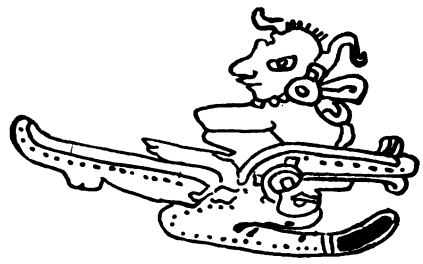

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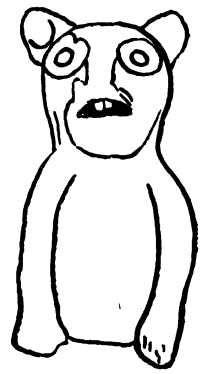

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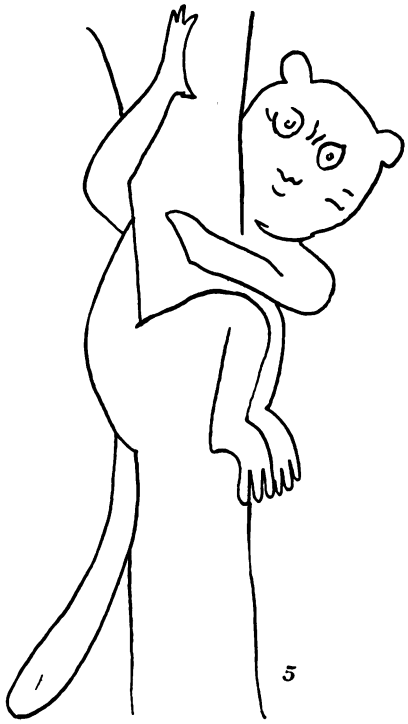

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PLATE 35

MAMMALIA

Coyote, Bear, Jaguar

1. Probably a coyote (*Canis*), Nuttall 6.
2. Same, Nuttall 26.
3. Possibly a bear (*Ursus*), Dresden 37a.
4. Same, Chichen Itza, Temple of the Tigers (Maudslay, III, 38).
5. Jaguar (*Felis hernandezi*), Dresden 8a.
6. Glyph, probably of a jaguar head, Copan, Stela 4 (Maudslay, I, Pl. 104).
7. Copan, Altar F (Maudslay, I, Pl. 114).
8. Jaguar, Tro-Cortesianus 28c.
9. Stone carving of jaguar head, Palenque, Palace, House C (Maudslay, IV, Pl. 24).
10. Jaguar, Tro-Cortesianus 30b.
11. Glyph, probably of a jaguar.
12. Head of jaguar in fresco, Santa Rita (Gann, 1897–1898, Pl. 31).
13. Same, Tro-Cortesianus 2a.
14. Same, Nuttall 27.

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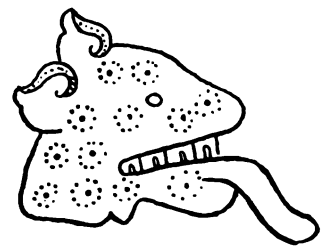

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PLATE 36

MAMMALIA

Dog (*Canis*)

1. Dog and crab, Tro-Cortesianus 88c.
2. Tro-Cortesianus 37b.
3. Tro-Cortesianus 66b.
4. Head, Nuttall 34.
5. Nuttall 72.
6. Head, Nuttall 20.
7. Probably a dog, Nuttall 3.
8. Aubin 9.
9. Glyph for day sign *Oc*.
10. Same.
11. Same.
12. Tro-Cortesianus 91d.
13. Glyph for Nahua day sign *Itzcuintli*, Aubin 9.
14. Tro-Cortesianus 27d.

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PLATE 37

MAMMALIA

Dog (*Canis*)

1. Dog bearing firebrands, Dresden 40b.
2. Same, Dresden 39a.
3. Same, Dresden 36a.
4. Tro-Cortesianus 88a.
5. Dresden 21b.
6. Tro-Cortesianus 24c.
7. Dresden 13c.
8. Tro-Cortesianus 37a.
9. Dresden 30a.
10. Dresden 7a.
11. Glyph supposed to represent a dog's ribs, Dresden 13c.
12. Dresden 29a.
13. Head, Tro-Cortesianus 91d.

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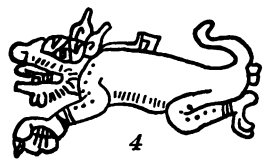

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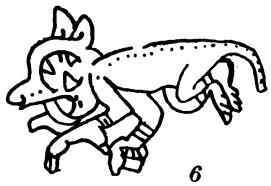

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PLATE 38

MAMMALIA

LEAF-NOSED BAT (*Vampyrus spectrum* or *Phyllostomus hastatus panamensis*)

1. Glyph, Chichen Itza, Akat 'Cib (Maudslay, III, Pl. 19.)
2. Glyph, Copan (Maudslay, I, Pl. 8).
3. Bat god, drawn as glyph, Copan, Stela D (Maudslay, I, Pl. 48).
4. Glyph, Copan (Maudslay, I, Pl. 8).
5. Glyph, Palenque, Temple of the Inscriptions (Maudslay, IV, Pl. 60, gl. Q 1).
6. Glyph, Tikal (Maudslay III, Pl. 74, gl. 41).
7. Bat god used as decoration on pottery, Chama (Dieseldorff, 1904).

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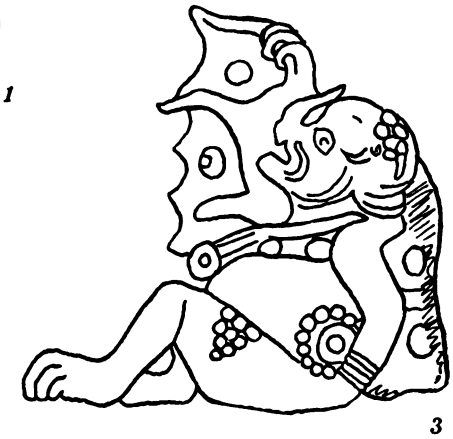

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PLATE 39

MAMMALIA

Monkey and Miscellaneous

1. Capuchin monkey (*Cebus capucinus*), Nuttall 1.
2. Same, Nuttall 5.
3. Head of same, Nuttall 38.
4. Nondescript animal, possibly a combination of monkey and peccary, Tro-Cortesianus 88c.
5. Glyph, possibly representing a monkey, found in connection with fig. 4.
6. Glyph of head of monkey, Nuttall 1.
7. Head of long-nosed god, Tro-Cortesianus 30a.
8. Head of monkey, glyph for Nahua day sign, *Oçomatli*, Aubin 9.
9. Long-nosed god, Tro-Cortesianus 30b.
10. God with head-dress, Dresden 5c.

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